

FIG.1

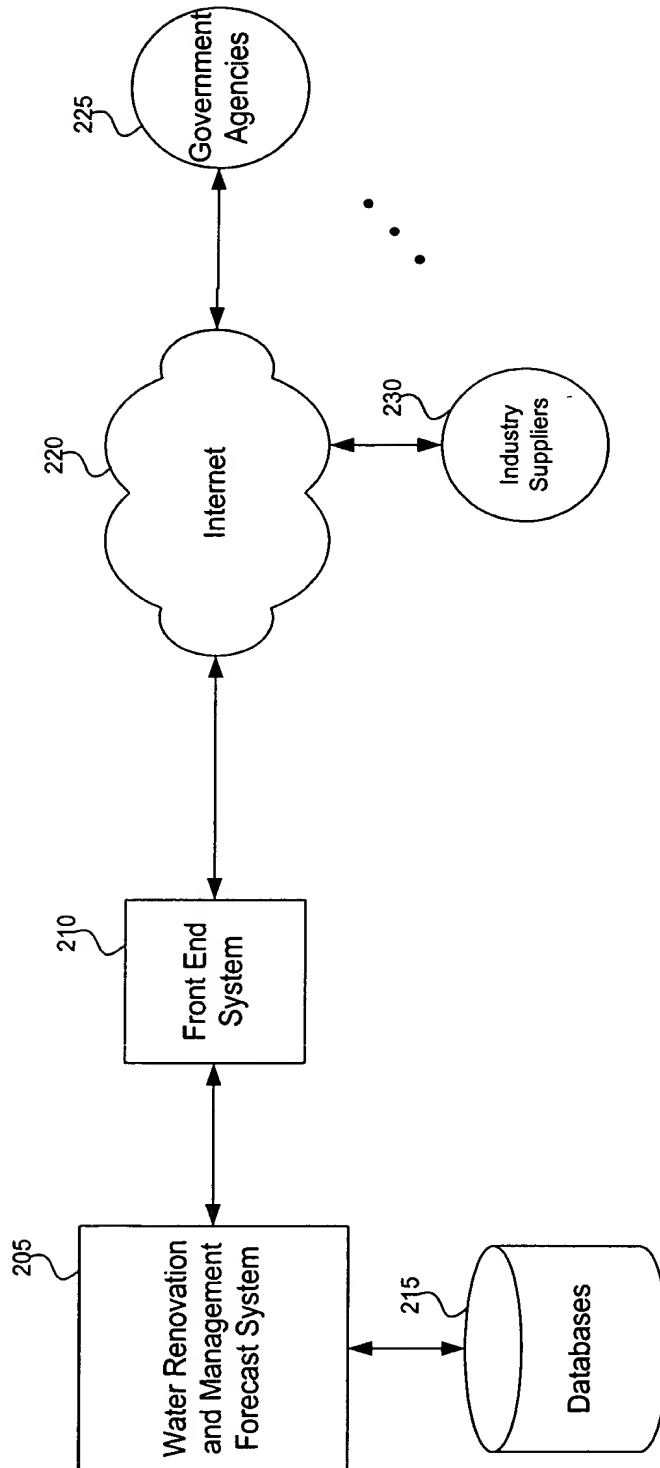
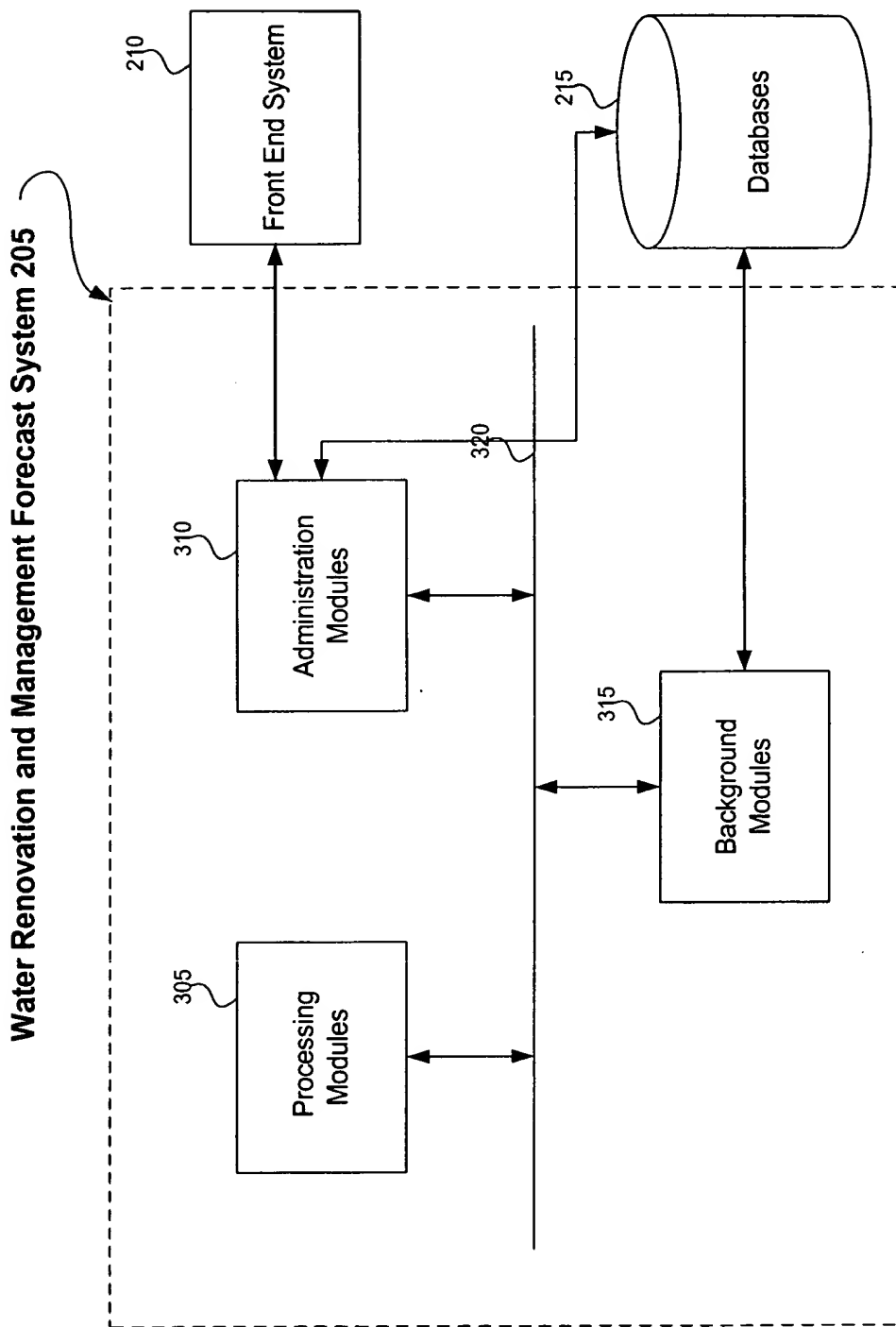


FIG. 2



**FIG. 3**

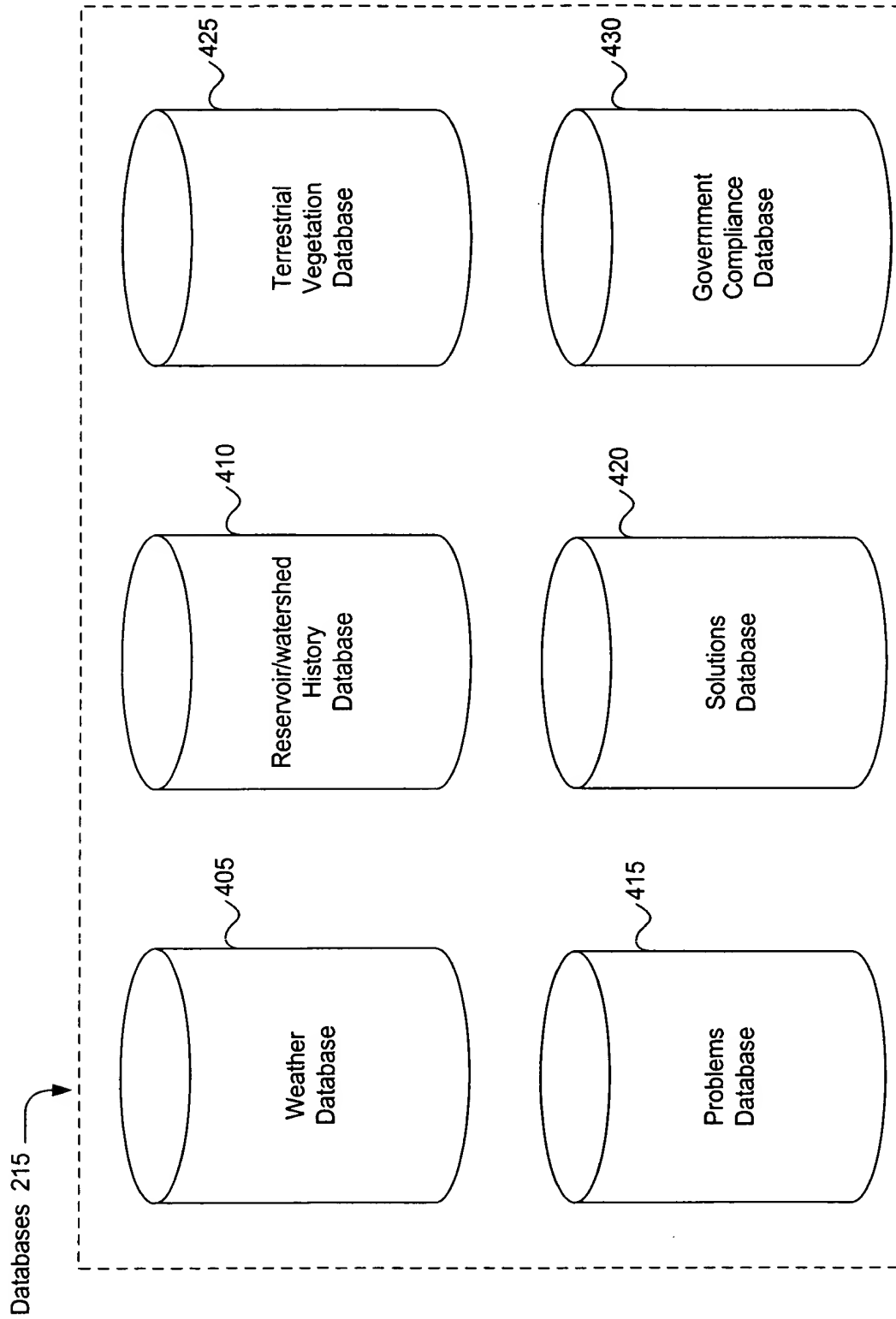
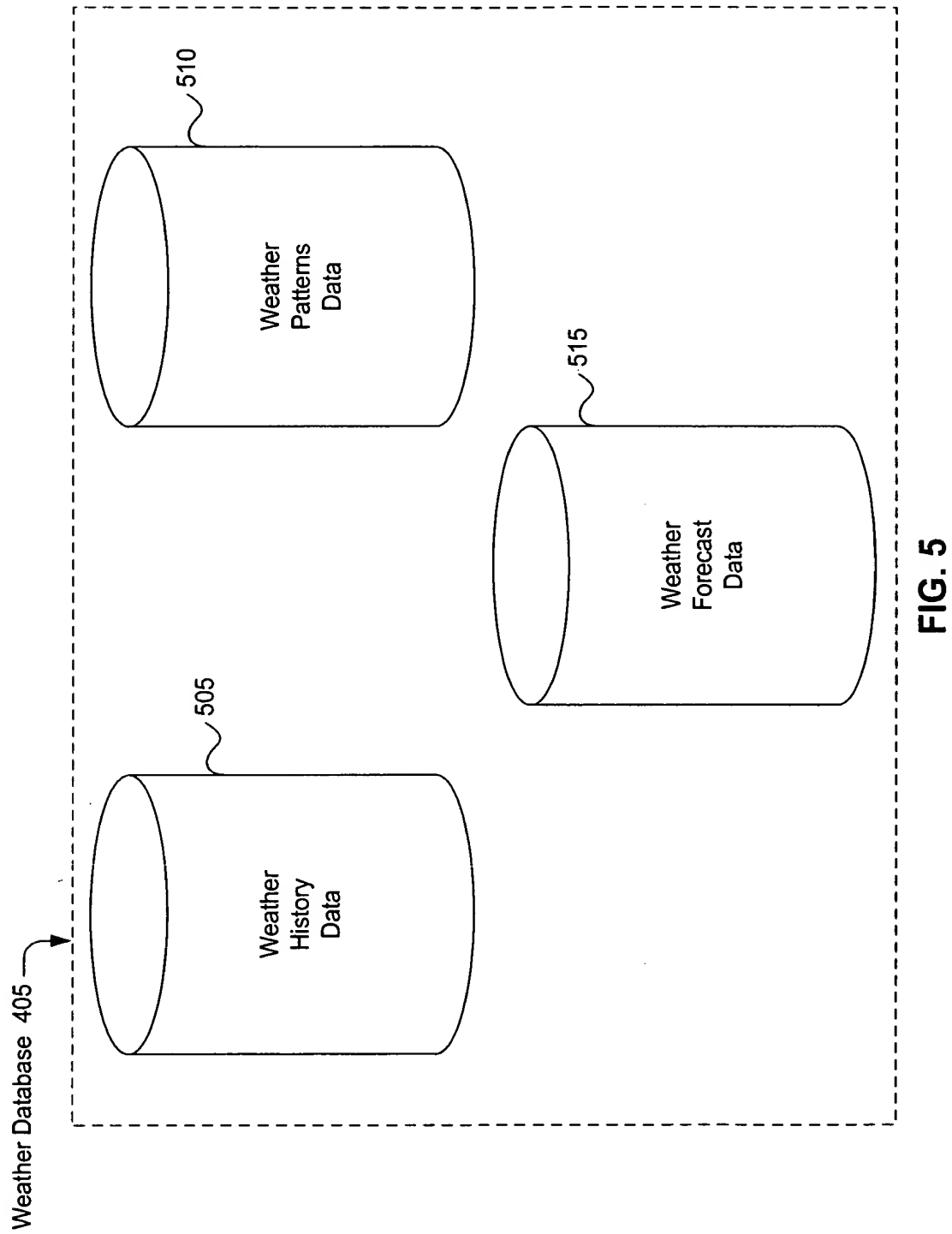


FIG. 4



Weather History Data 505

| Year | MA    | Data Type               | Period1 | Period2 | Period3 | Period4 | Period5 | Period6 |
|------|-------|-------------------------|---------|---------|---------|---------|---------|---------|
| :    | :     | :                       | :       | :       | :       | :       | :       | :       |
| 1997 | MA100 | temp.sea                | 46      | 47      | 50      | 51      | 49      | 47      |
| 1998 | MA100 | temp.sea                | 46      | 47      | 49      | 51      | 50      | 48      |
| 1997 | MA100 | prec.sea                | 1.01    | 1.03    | 1.08    | 1.1     | 1.12    | 1.1     |
| 1998 | MA100 | prec.sea                | 1.01    | 1.03    | 1.07    | 1.1     | 1.12    | 1.1     |
| 1997 | MA100 | wind_speed.sea          | 17      | 15      | 5       | 7       | 10      | 14      |
| 1998 | MA100 | wind_speed.sea          | 16      | 15      | 4       | 7       | 10      | 13      |
| 1997 | MA100 | solar_radiation.sea     | 3.4     | 4.1     | 4.2     | 5.5     | 4.3     | 3.8     |
| 1998 | MA100 | solar_radiation.sea     | 3.4     | 4.0     | 4.2     | 5.4     | 4.0     | 3.7     |
| 1997 | MA100 | cloud_cover.sea         | 75      | 75      | 25      | 25      | 25      | 75      |
| 1998 | MA100 | cloud_cover.sea         | 75      | 75      | 25      | 25      | 25      | 75      |
| 1997 | MA100 | cooling_rate.sea        | 0.2     | 0.3     | 0.2     | 0.2     | 0.2     | 0.1     |
| 1998 | MA100 | cooling_rate.sea        | 0.3     | 0.3     | 0.2     | 0.2     | 0.2     | 0.2     |
| 1997 | MA100 | growing_degree_days.sea | 24      | 25      | 25      | 21      | 19      | 16      |
| 1998 | MA100 | growing_degree_days.sea | 24      | 26      | 25      | 21      | 19      | 16      |
| :    | :     | :                       | :       | :       | :       | :       | :       | :       |

FIG. 6A

Weather History Data 505

| Year | MA    | Data Type           | Period1 | Period2 | Period3 | Period4 | Period5 | Period6 |
|------|-------|---------------------|---------|---------|---------|---------|---------|---------|
| 1997 | MA100 | temp                | 49      | 43      | 45      | 47      | 50      | 42      |
| 1998 | MA100 | temp                | 53      | 51      | 56      | 50      | 58      | 54      |
| 1997 | MA100 | prec                | 1.5     | 0.4     | 0.9     | 1.3     | 1.7     | 0.3     |
| 1998 | MA100 | prec                | 1.1     | 0.01    | 2.68    | 1.78    | 0.48    | 0.01    |
| 1997 | MA100 | wind_speed          | 15      | 14      | 5       | 7       | 16      | 20      |
| 1998 | MA100 | wind_speed          | 12      | 15      | 10      | 8       | 18      | 21      |
| 1997 | MA100 | solar_radiation     | 3.0     | 4.1     | 4.0     | 5.2     | 4.3     | 4.0     |
| 1998 | MA100 | solar_radiation.sea | 3.4     | 4.0     | 4.5     | 5.4     | 4.0     | 3.7     |
| 1997 | MA100 | cloud_cover         | 100     | 75      | 25      | 25      | 25      | 0       |
| 1998 | MA100 | cloud_cover         | 75      | 75      | 25      | 25      | 25      | 25      |
| 1997 | MA100 | cooling_rate        | 0.3     | 0.3     | 0.2     | 0.2     | 0.2     | 0.1     |
| 1998 | MA100 | cooling_rate        | 0.3     | 0.3     | 0.2     | 0.2     | 0.2     | 0.2     |
| 1997 | MA100 | growing_degree_days | 26      | 27      | 25      | 25      | 19      | 16      |
| 1998 | MA100 | growing_degree_days | 23      | 26      | 25      | 20      | 19      | 15      |
| :    | :     | :                   | :       | :       | :       | :       | :       | :       |

FIG. 6B

Weather History Data 505

| Year | MA    | Data Type               | Period1 | Period2 | Period3 | Period4 | Period5 | Period6 |
|------|-------|-------------------------|---------|---------|---------|---------|---------|---------|
| 1997 | MA100 | temp.cat                | 1       | -1      | -1      | -1      | 1       | -1      |
| 1998 | MA100 | temp.cat                | 1       | 1       | 1       | -1      | 1       | 1       |
| 1997 | MA100 | prec.cat                | 1       | -1      | -1      | 1       | 1       | -1      |
| 1998 | MA100 | prec.cat                | 1       | -1      | 1       | 1       | -1      | -1      |
| 1997 | MA100 | wind_speed.cat          | -1      | -1      | 0       | 0       | 1       | 1       |
| 1998 | MA100 | wind_speed.cat          | -1      | 0       | 1       | 1       | 1       | 1       |
| 1997 | MA100 | solar_radiation.cat     | -1      | 0       | -1      | -1      | 0       | 1       |
| 1998 | MA100 | solar_radiation.cat     | 0       | 0       | -1      | 0       | 0       | 0       |
| 1997 | MA100 | cloud_cover.cat         | 1       | 0       | 0       | 0       | 0       | -1      |
| 1998 | MA100 | cloud_cover.cat         | 0       | 0       | 0       | 0       | 0       | -1      |
| 1997 | MA100 | cooling_rate.cat        | 1       | 0       | 0       | 0       | 0       | 0       |
| 1998 | MA100 | cooling_rate.cat        | 0       | 0       | 0       | 0       | 0       | 0       |
| 1997 | MA100 | growing_degree_days.cat | 1       | 1       | 0       | 1       | 0       | 0       |
| 1998 | MA100 | growing_degree_days.cat | -1      | 0       | 0       | -1      | 0       | -1      |
| :    | :     | :                       | :       | :       | :       | :       | :       | :       |

FIG. 6C



Weather Patterns Data 510

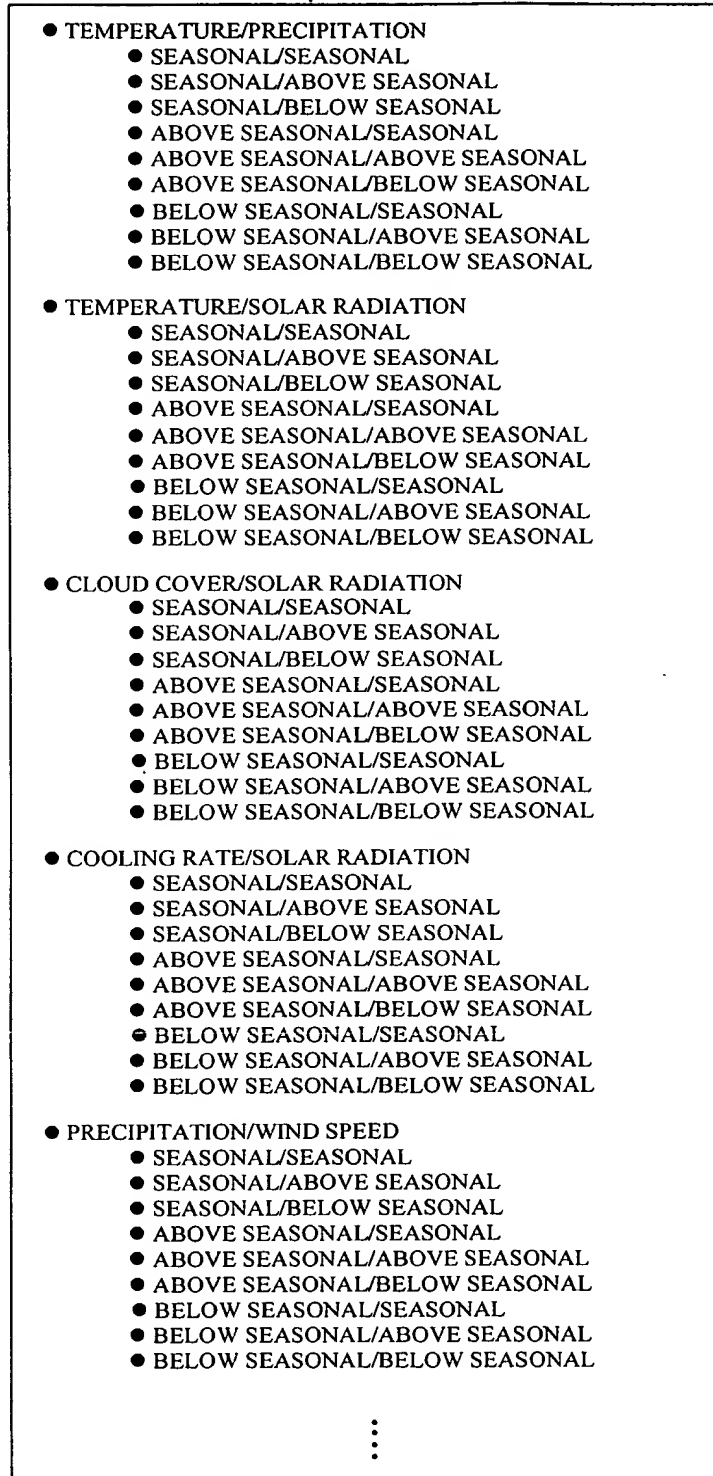


FIG. 7A

## Weather Patterns Data 510



- SUSTAINED WEATHER
  - TEMPERATURE SUSTAINED 2 PERIODS
  - TEMPERATURE SUSTAINED 3 PERIODS
  - PRECIPITATION SUSTAINED 2 PERIODS
  - PRECIPITATION SUSTAINED 3 PERIODS
  - WIND SPEED SUSTAINED 2 PERIODS
  - WIND SPEED SUSTAINED 3 PERIODS
  - SOLAR RADIATION SUSTAINED 2 PERIODS
  - SOLAR RADIATION SUSTAINED 3 PERIODS
  - CLOUD COVER SUSTAINED 2 PERIODS
  - CLOUD COVER SUSTAINED 3 PERIODS
  - COOLING RATE SUSTAINED 2 PERIODS
  - COOLING RATE SUSTAINED 3 PERIODS
  - GROWING DEGREE DAYS SUSTAINED 2 PERIODS
  - GROWING DEGREE DAYS SUSTAINED 3 PERIODS
- TEMPERATURE/PRECIPITATION LAG 1 PERIOD
  - SEASONAL/SEASONAL
  - SEASONAL/ABOVE SEASONAL
  - SEASONAL/BELOW SEASONAL
  - ABOVE SEASONAL/SEASONAL
  - ABOVE SEASONAL/ABOVE SEASONAL
  - ABOVE SEASONAL/BELOW SEASONAL
  - BELOW SEASONAL/SEASONAL
  - BELOW SEASONAL/ABOVE SEASONAL
  - BELOW SEASONAL/BELOW SEASONAL
- TEMPERATURE/SOLAR RADIATION LAG 1 PERIOD
  - SEASONAL/SEASONAL
  - SEASONAL/ABOVE SEASONAL
  - SEASONAL/BELOW SEASONAL
  - ABOVE SEASONAL/SEASONAL
  - ABOVE SEASONAL/ABOVE SEASONAL
  - ABOVE SEASONAL/BELOW SEASONAL
  - BELOW SEASONAL/SEASONAL
  - BELOW SEASONAL/ABOVE SEASONAL
  - BELOW SEASONAL/BELOW SEASONAL
- CLOUD COVER/SOLAR RADIATION LAG 1 PERIOD
  - SEASONAL/SEASONAL
  - SEASONAL/ABOVE SEASONAL
  - SEASONAL/BELOW SEASONAL
  - ABOVE SEASONAL/SEASONAL
  - ABOVE SEASONAL/ABOVE SEASONAL
  - ABOVE SEASONAL/BELOW SEASONAL
  - BELOW SEASONAL/SEASONAL
  - BELOW SEASONAL/ABOVE SEASONAL
  - BELOW SEASONAL/BELOW SEASONAL

⋮

**FIG. 7B**

Weather Forecast Data 515

| Year | MA    | Data Type               | Period1 | Period2 | Period3 | Period4 | Period5 | Period6 |
|------|-------|-------------------------|---------|---------|---------|---------|---------|---------|
| N+1  | MA100 | temp.sea                | 47      | 47      | 49      | 52      | 54      | 55      |
| N+1  | MA100 | prec.sea                | 1.00    | 1.03    | 1.06    | 1.05    | 1.10    | 1.1     |
| N+1  | MA100 | wind_speed.sea          | 18      | 14      | 5       | 7       | 11      | 15      |
| N+1  | MA100 | solar_radiation.sea     | 3.4     | 4.1     | 4.2     | 5.4     | 4.2     | 3.7     |
| N+1  | MA100 | cloud_cover.sea         | 75      | 75      | 25      | 0       | 25      | 75      |
| N+1  | MA100 | cooling_rate.sea        | ?       | ?       | ?       | ?       | ?       | ?       |
| N+1  | MA100 | growing_degree_days.sea | 24      | 27      | 27      | 25      | 20      | 17      |
| :    | :     | :                       | :       | :       | :       | :       | :       | :       |
| N+1  | MA100 | temp                    | 48      | 49      | 50      | 53      | 55      | 57      |
| N+1  | MA100 | prec                    | 1.1     | 1.05    | 1.05    | 1.00    | 1.15    | 1.2     |
| N+1  | MA100 | wind_speed              | 16      | 16      | 7       | 5       | 16      | 20      |
| N+1  | MA100 | solar_radiation         | 3.5     | 4.5     | 4.5     | 5.5     | 5.0     | 4.3     |
| N+1  | MA100 | cloud_cover             | 75      | 25      | 75      | 25      | 0       | 25      |
| N+1  | MA100 | cooling_rate            | 0.2     | 0.3     | 0.2     | 0.2     | 0.2     | 0.2     |
| N+1  | MA100 | growing_degree_days     | 24      | 28      | 26      | 22      | 20      | 16      |
| :    | :     | :                       | :       | :       | :       | :       | :       | :       |

FIG. 8A

Weather Forecast Data 515

| Year | MA    | Data Type               | Period1 | Period2 | Period3 | Period4 | Period5 | Period6 |
|------|-------|-------------------------|---------|---------|---------|---------|---------|---------|
| N+1  | MA100 | temp.cat                | 1       | 1       | 1       | 1       | 1       | 1       |
| N+1  | MA100 | prec.cat                | 1       | 1       | -1      | -1      | 1       | 1       |
| N+1  | MA100 | wind_speed.cat          | -1      | 1       | 1       | -1      | 1       | 1       |
| N+1  | MA100 | solar_radiation.cat     | 1       | 1       | 1       | 1       | 1       | 1       |
| N+1  | MA100 | cloud_cover.cat         | 0       | -1      | 1       | 1       | -1      | -1      |
| N+1  | MA100 | cooling_rate.cat        | -1      | 0       | 0       | 0       | 0       | 0       |
| N+1  | MA100 | growing_degree_days.cat | 0       | 1       | -1      | -1      | 0       | -1      |
| :    | :     | :                       | :       | :       | :       | :       | :       | :       |

605 610 615 620 810 815

FIG. 8B

| Reservoir/<br>Watershed<br>History<br>Database 410 | Year | Reservoir MA | Description of Watershed |     |     |     |     |     |     |     |                     |     | Recorded Problems | Attempted Solutions |                 |          |       |       |          | Size in Acres of Water Supply versus Total Size | Ownership Type | Uses (%)    |        |          |           |         |         |         |         |         |         |         |         |         |         |         |         |                |               |            |            |                     |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   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|--|------|--------------|--------------------------|-----|-----|-----|-----|-----|-----|-----|---------------------|-----|-------------------|---------------------|-----------------|----------|-------|-------|----------|---|----------------|-------------|--------|----------|-----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------------|---------------|------------|------------|---------------------|-------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---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|  |      |              | 945                      |     |     |     |     |     |     |     | 950                 |     |                   | 620                 |                 |          |       |       |          |   |                | 620         |        |          |           |         |         |         |         |         |         |         |         |         |         |         |         |                |               |            |            |                     |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   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|  |      |              | Terrain (%)              |     |     |     |     |     |     |     | Aquatic Systems (%) |     |                   | Period1             |                 |          |       |       |          |   |                | Period2     |        |          |           |         |         |         |         |         |         |         |         |         |         |         |         |                |               |            |            |                     |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   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|  |      |              | 945                      | 960 | 965 | 970 | 975 | 980 | 985 | 987 | 989                 | 990 |                   | Other               | Streams/ Rivers | Wetlands | Ponds | Other | Industry |   |                | Residential | Forest | Cropland | Grassland | Period1 | Period2 | Period3 | Period4 | Period5 | Period6 | Period1 | Period2 | Period3 | Period4 | Period5 | Period6 | Drinking Water | Flood Control | Irrigation | Recreation | Power Plant Cooling | Other |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   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FIG. 9

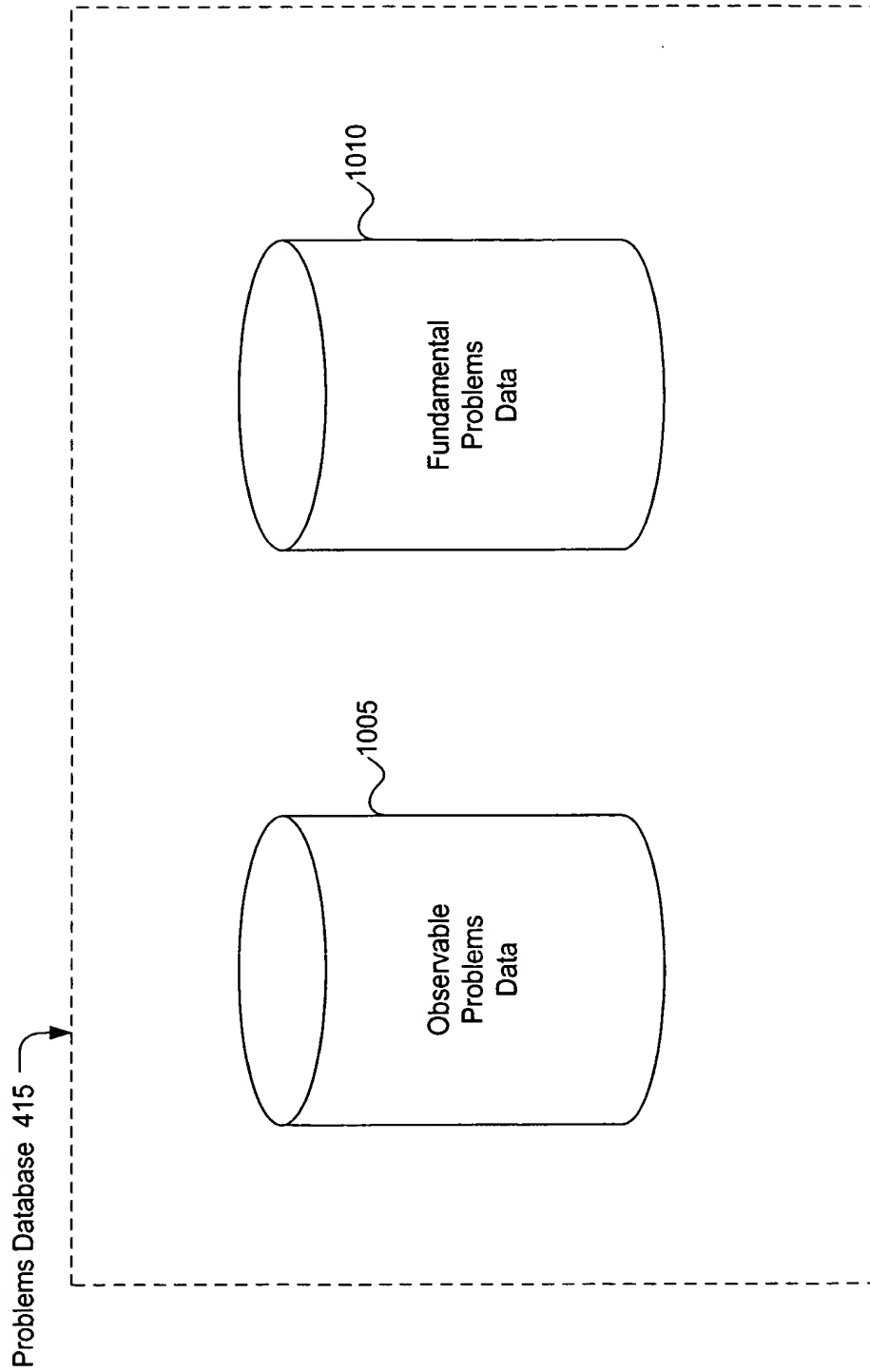


FIG. 10

Observable Problems Data 1005

| Observable Problem | Description                             | Related Fundamental/Observable Problems |
|--------------------|---|---|
| OP1                | Objectionable Taste and Odor Conditions | OP3, OP6, FP2, FP3, FP4                 |
| OP2                | Declining Wildlife (e.g., fish)         | OP5, OP6, OP8, FP3, FP4                 |
| OP3                | Shallow Water                           | FP3                                     |
| OP4                | Decreased Water Clarity                 | FP3, FP4                                |
| OP5                | Decreased Water Flow                    | FP3, FP4                                |
| OP6                | Excessive Plant Growth                  | FP1, FP4                                |
| ⋮                  | ⋮                                       | ⋮                                       |

FIG. 11

Fundamental Problems Data 1010

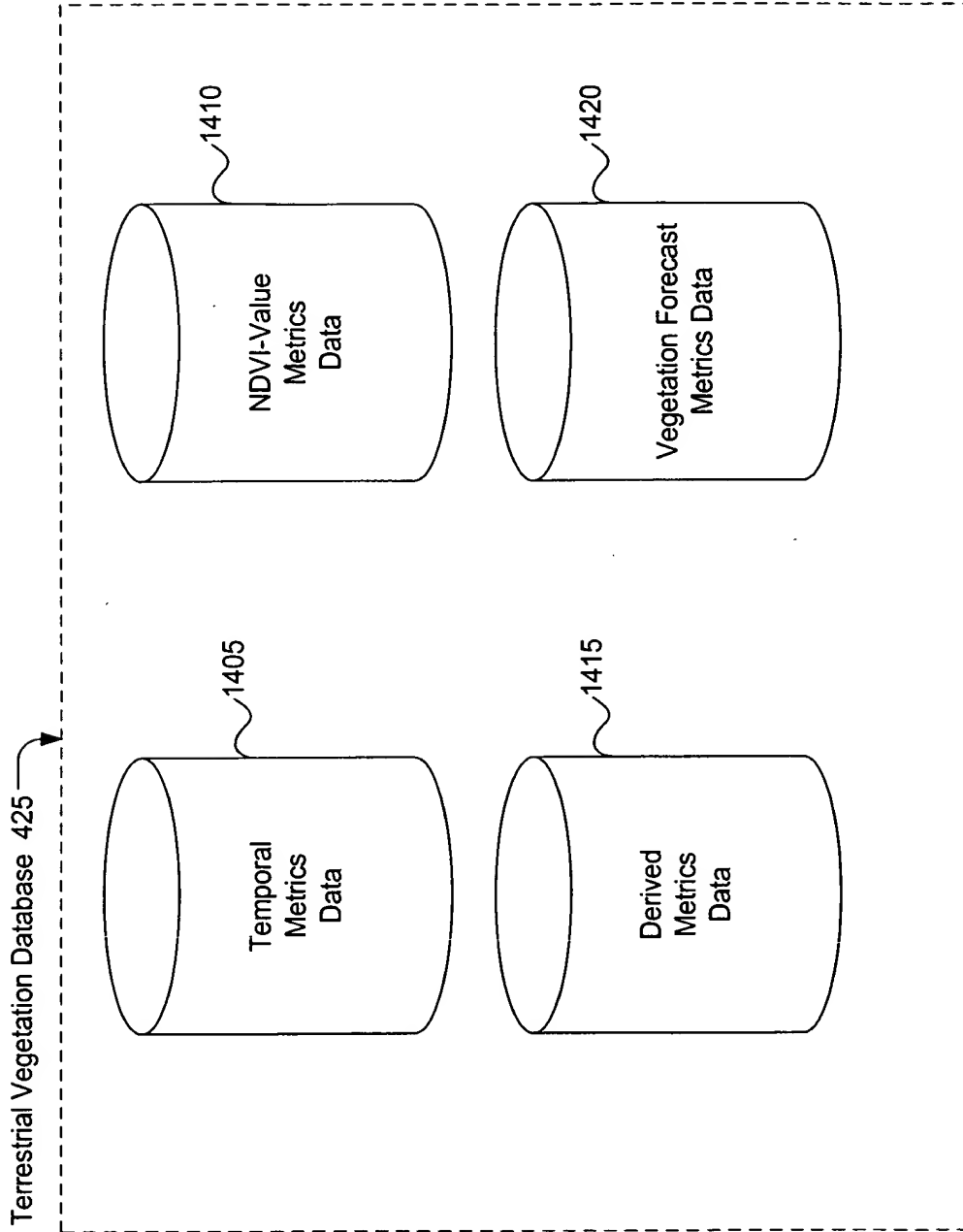
| 1205                | 1210                               | 1215  | 1217   | 1220                           |
|---------------------|------------------------------------|---|--|--------------------------------|
| Fundamental Problem | Description                        | Related Weather Causes  | Related Terrestrial Vegetation Causes  | Possible Solutions (✓)         |
| 1225                |                                    |   |  |                                |
| FP1                 | Elevated Plant Nutrient Levels     | Excessive watershed runoff due to high precipitation and/or high wind speed; high temperature; high solar radiation and/or reduced cloud coverage increasing water temperature, decreasing water circulation, and increasing plant growth | Early season greenness in agricultural areas;<br>Late season greenness in agricultural areas | S1 ✓ S2 S3 ✓ S4 S5 S6 S7 S8 S9 |
| FP2                 | Elevated Chemical Levels (Geosmin) | High solar radiation, high temperatures, low cooling rate, and/or reduced cloud coverage decreasing water circulation and increasing plant growth   | Early season greenness in agricultural areas;<br>Late season greenness in agricultural areas | S1 ✓ S2 S3 ✓ S4 S5 S6 S7 S8 S9 |
| FP3                 | Siltation                          | Excessive watershed runoff due to high precipitation and/or high wind speed   | Early season greenness in agricultural areas;<br>Late season greenness in agricultural areas | S1 S2 S3 ✓ S4 S5 S6 S7 S8 S9   |
| FP4                 | Thermal Stratification             | Warm temperatures in the spring and early summer; High solar radiation, high temperatures, low cooling rate, and/or reduced cloud coverage decreasing water circulation   |  | S1 ✓ S2 S3 S4 ✓ S5 S6 S7 S8 S9 |
| :                   | :                                  | :   | :  | :                              |
| :                   | :                                  | :   | :  | :                              |
| :                   | :                                  | :   | :  | :                              |

FIG. 12



| Solutions Database 420 |          |  |       |                 |                  |                      |  |      |  |      |  |      |  |
|------------------------|----------|--|-------|-----------------|------------------|----------------------|--|------|--|------|--|------|--|
| 1305                   |          | 1310   |       | 1315            |                  | 1320                 |  | 1325 |  | 1330 |  | 1335 |  |
| Type of Solution       | Solution | Description  | Term  | Economic Impact | Political Impact | Environmental Impact |  |      |  |      |  |      |  |
| Physical               | S1       | Adjust Water Level   | short | low             | high             | medium               |  |      |  |      |  |      |  |
|                        | S2       | Cut Weeds  | short | medium          | low              | low                  |  |      |  |      |  |      |  |
|                        | S3       | Dredge   | long  | high            | low              | low                  |  |      |  |      |  |      |  |
|                        | S4       | Aeration (Destratification)  | short | medium          | low              | low                  |  |      |  |      |  |      |  |
|                        | S5       | Alter Adjacent Land Use  | long  | high            | high             | high                 |  |      |  |      |  |      |  |
|                        | S6       | Disinfect (Water Treatment)  | long  | high            | low              | low                  |  |      |  |      |  |      |  |
|                        | S7       | Filter (Water Treatment)   | long  | high            | low              | low                  |  |      |  |      |  |      |  |
|                        | S8       | Apply different types of fertilizer to crops                               | short | low             | high             | medium               |  |      |  |      |  |      |  |
|                        | S9       | Apply fertilizer at time sensitive times relating to terrestrial greenness | short | low             | high             | low                  |  |      |  |      |  |      |  |
| Chemical               | S10      | Introduce Herbicides   | short | medium          | high             | high                 |  |      |  |      |  |      |  |
| Biological             | S11      | Introduce Fish   | long  | medium          | low              | low                  |  |      |  |      |  |      |  |
| :                      | :        | :  | :     | :               | :                | :                    |  |      |  |      |  |      |  |

FIG. 13



**FIG. 14**

Temporal Metrics Data 1405

| Year | MA    | Temporal Metrics 1505          |         |         |         |         |         |                              |         |         |         |         |         |                           |         |         |         |         |         |
|------|-------|--------------------------------|---------|---------|---------|---------|---------|------------------------------|---------|---------|---------|---------|---------|---------------------------|---------|---------|---------|---------|---------|
|      |       | 1510                           |         |         |         |         |         | 1515                         |         |         |         |         |         | 1520                      |         |         |         |         |         |
|      |       | Time of Onset of Greenness 620 |         |         |         |         |         | Time of End of Greenness 620 |         |         |         |         |         | Duration of Greenness 620 |         |         |         |         |         |
|      |       | Period1                        | Period2 | Period3 | Period4 | Period5 | Period6 | Period1                      | Period2 | Period3 | Period4 | Period5 | Period6 | Period1                   | Period2 | Period3 | Period4 | Period5 | Period6 |
| 1997 | MA100 | 80                             | 81      | 80      | 88      | 86      | 81      | 250                          | 255     | 252     | 260     | 245     | 250     | 70                        | 74      | 72      | 62      | 59      | 69      |
| 1998 | MA100 | 75                             | 77      | 80      | 85      | 85      | 83      | 239                          | 244     | 266     | 250     | 250     | 249     | 64                        | 67      | 86      | 65      | 66      | 66      |
| 1997 | MA101 | 92                             | 93      | 101     | 101     | 100     | 95      | 251                          | 250     | 251     | 249     | 245     | 250     | 59                        | 57      | 50      | 48      | 45      | 55      |
| 1998 | MA101 | 101                            | 101     | 115     | 115     | 103     | 97      | 245                          | 250     | 250     | 246     | 245     | 250     | 44                        | 49      | 35      | 31      | 42      | 53      |
|      |       |                                |         |         |         |         |         |                              |         |         |         |         |         |                           |         |         |         |         |         |
|      |       |                                |         |         |         |         |         |                              |         |         |         |         |         |                           |         |         |         |         |         |

1530

1535

FIG. 15

NDVI-Value Metrics Data 1410

|      |       | 1605                            |         |         |         |         |         |                               |         |         |         |         |         | 1630                      |         |         |         |         |         |                    |         |         |         |         |         |
|------|-------|---------------------------------|---------|---------|---------|---------|---------|-------------------------------|---------|---------|---------|---------|---------|---------------------------|---------|---------|---------|---------|---------|--------------------|---------|---------|---------|---------|---------|
|      |       | 1610                            |         |         |         |         |         | 1615                          |         |         |         |         |         | 1620                      |         |         |         |         |         | 1625               |         |         |         |         |         |
|      |       | NDVI-Value Metrics              |         |         |         |         |         | NDVI-Value Metrics            |         |         |         |         |         | NDVI-Value Metrics        |         |         |         |         |         | NDVI-Value Metrics |         |         |         |         |         |
| Year | MA    | Value of Onset of Greenness 620 |         |         |         |         |         | Value of End of Greenness 620 |         |         |         |         |         | Value of Maximum NDVI 620 |         |         |         |         |         | Range of NDVI 620  |         |         |         |         |         |
|      |       | Period1                         | Period2 | Period3 | Period4 | Period5 | Period6 | Period1                       | Period2 | Period3 | Period4 | Period5 | Period6 | Period1                   | Period2 | Period3 | Period4 | Period5 | Period6 | Period1            | Period2 | Period3 | Period4 | Period5 | Period6 |
| :    | :     | :                               | :       | :       | :       | :       | :       | :                             | :       | :       | :       | :       | :       | :                         | :       | :       | :       | :       | :       | :                  | :       | :       | :       | :       | :       |
| 1997 | MA100 | 120                             | 25      | 122     | 119     | 126     | 115     | 18                            | 20      | 19      | 17      | 21      | 12      | 20                        | 69      | 71      | 68      | 69      | 70      | 49                 | 48      | 47      | 51      | 47      | 50      |
| 1998 | MA100 | 115                             | 17      | 120     | 119     | 125     | 110     | 20                            | 20      | 21      | 20      | 18      | 20      | 70                        | 70      | 68      | 65      | 66      | 66      | 44                 | 47      | 50      | 50      | 48      | 47      |
| 1997 | MA101 | 132                             | 133     | 150     | 117     | 130     | 125     | 130                           | 18      | 20      | 19      | 19      | 11      | 15                        | 65      | 65      | 66      | 70      | 71      | 69                 | 50      | 51      | 48      | 54      | 53      |
| 1998 | MA101 | 145                             | 51      | 130     | 120     | 125     | 125     | 135                           | 19      | 25      | 20      | 20      | 11      | 16                        | 69      | 70      | 70      | 71      | 69      | 70                 | 48      | 51      | 53      | 53      | 48      |
| :    | :     | :                               | :       | :       | :       | :       | :       | :                             | :       | :       | :       | :       | :       | :                         | :       | :       | :       | :       | :       | :                  | :       | :       | :       | :       | :       |

FIG. 16

Derived Metrics Data 1415

| Year | MA    | Derived Metrics      |      |      |                      |     |     |                        |      |      |                     |     |     |
|------|-------|----------------------|------|------|----------------------|-----|-----|------------------------|------|------|---------------------|-----|-----|
|      |       | 1710                 |      |      | 1715                 |     |     | 1720                   |      |      | 1725                |     |     |
|      |       | Accumulated NDVI 620 |      |      | Rate of Green-up 620 |     |     | Rate of Senescence 620 |      |      | Mean Daily NDVI 620 |     |     |
| ...  | ...   | Period1              | ...  | ...  | Period1              | ... | ... | Period1                | ...  | ...  | Period1             | ... | ... |
| ...  | ...   | Period2              | ...  | ...  | Period2              | ... | ... | Period2                | ...  | ...  | Period2             | ... | ... |
| ...  | ...   | Period3              | ...  | ...  | Period3              | ... | ... | Period3                | ...  | ...  | Period3             | ... | ... |
| ...  | ...   | Period4              | ...  | ...  | Period4              | ... | ... | Period4                | ...  | ...  | Period4             | ... | ... |
| ...  | ...   | Period5              | ...  | ...  | Period5              | ... | ... | Period5                | ...  | ...  | Period5             | ... | ... |
| ...  | ...   | Period6              | ...  | ...  | Period6              | ... | ... | Period6                | ...  | ...  | Period6             | ... | ... |
| 1997 | MA100 | 1600                 | 1600 | 1620 | 2.2                  | 2.1 | 2.0 | -1.7                   | -1.9 | -1.7 | 155                 | 150 | 148 |
| 1998 | MA100 | 1620                 | 1590 | 1600 | 2.2                  | 2.2 | 2.0 | -1.6                   | -1.8 | -1.7 | 150                 | 150 | 150 |
| 1997 | MA100 | 1560                 | 1570 | 1590 | 2.0                  | 2.2 | 1.9 | -1.7                   | -1.8 | -1.7 | 152                 | 155 | 150 |
| 1998 | MA100 | 1590                 | 1600 | 1610 | 2.0                  | 2.1 | 2.0 | -1.7                   | -1.8 | -1.8 | 150                 | 152 | 155 |
| ...  | ...   | ...                  | ...  | ...  | ...                  | ... | ... | ...                    | ...  | ...  | ...                 | ... | ... |

FIG. 17

Vegetation Forecast Metrics Data 1420

| 610  |    | 1505                       |     |                          |     | 1520                  |     |                           |     | 1525                        |     |                           |     | 1610                  |     |               |     | 1615             |     |                  |     | 1620               |     |                 |     | 1625 |    |    |    | 1710 |    |    |    | 1715 |    |    |    | 1720 |    |    |    | 1725 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    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| Year | MA | Temporal Metrics           |     |                          |     |                       |     |                           |     | NDVI- Value Metrics         |     |                           |     |                       |     |               |     | Derived Metrics  |     |                  |     |                    |     |                 |     |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   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|      |    | 1510                       |     | 1515                     |     | 1520                  |     | 1525                      |     | 1610                        |     | 1615                      |     | 1620                  |     | 1625          |     | 1710             |     | 1715             |     | 1720               |     | 1725            |     |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   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|      |    | Time of Onset of Greenness | 620 | Time of End of Greenness | 620 | Duration of Greenness | 620 | Time of Maximum Greenness | 620 | Value of Onset of Greenness | 620 | Value of End of Greenness | 620 | Value of Maximum NDVI | 620 | Range of NDVI | 620 | Accumulated NDVI | 620 | Rate of Green-up | 620 | Rate of Senescence | 620 | Mean Daily NDVI | 620 |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   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.. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |

FIG. 18

Government Compliance Database 430 →

| 1905    |                      | 1910              |                                  | 1915 |    | 1920 |    |    |    |    |    |     |
|---------|----------------------|-------------------|----------------------------------|------|----|------|----|----|----|----|----|-----|
| Type    | State/Locality       | MA(s) Applicable  | Permit Required for Solution (✓) |      |    |      |    |    |    |    |    |     |
|         |                      |                   | S1                               | S2   | S3 | S4   | S5 | S6 | S7 | S8 | S9 | ... |
| Federal | -                    | MA100 -<br>MA1780 |                                  |      |    |      |    |    |    | ✓  |    | ... |
| State   | Alabama              | MA201 - MA215     |                                  |      | ✓  |      | ✓  | ✓  | ✓  | ✓  |    | ... |
|         | Alaska               | MA100 - MA109     |                                  |      | ✓  |      | ✓  | ✓  | ✓  | ✓  |    | ... |
|         | Arkansas             | MA390 - MA415     |                                  |      | ✓  |      | ✓  | ✓  | ✓  | ✓  | ✓  | ... |
|         | :                    | :                 | :                                | :    | :  | :    | :  | :  | :  | :  | :  | ... |
| Local   | Allegheny County, PA | MA129             | ✓                                |      | ✓  |      | ✓  |    | ✓  | ✓  |    | ... |
|         | Awexy County, MD     | MA909             |                                  |      | ✓  |      | ✓  | ✓  | ✓  | ✓  | ✓  | ... |
|         | Buck County, PA      | MA128             | ✓                                |      | ✓  |      | ✓  | ✓  | ✓  | ✓  | ✓  | ... |
|         | :                    | :                 | :                                | :    | :  | :    | :  | :  | :  | :  | :  | ... |

FIG. 19

Background Modules 315

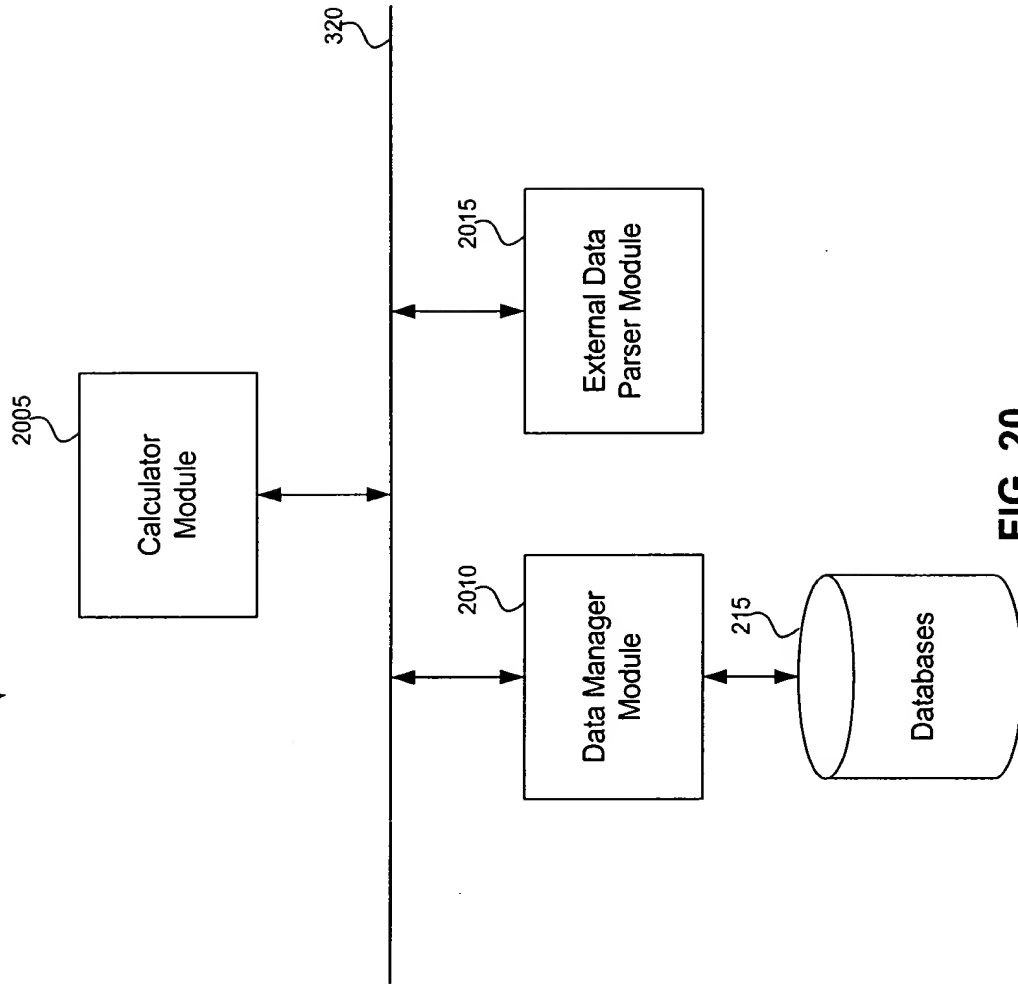


FIG. 20



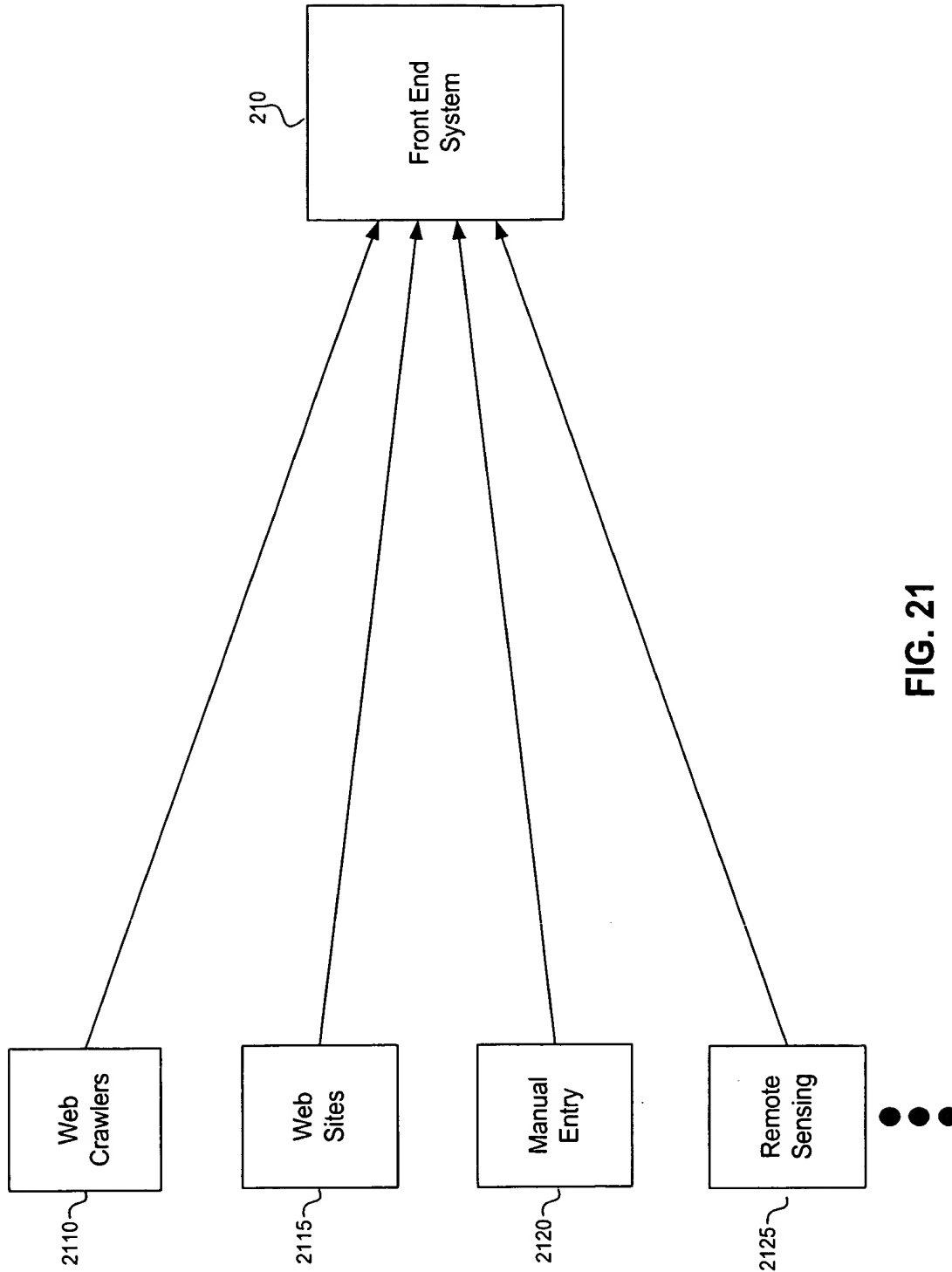


FIG. 21

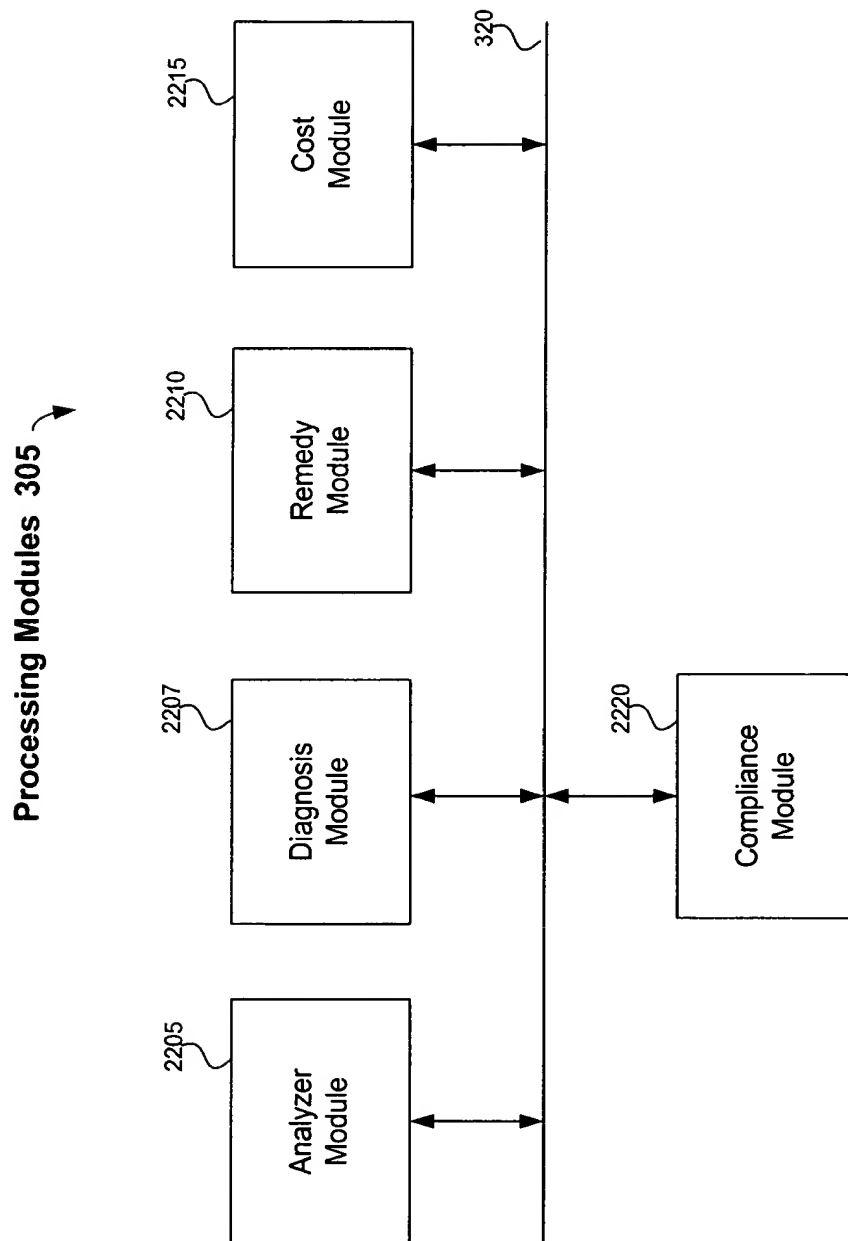
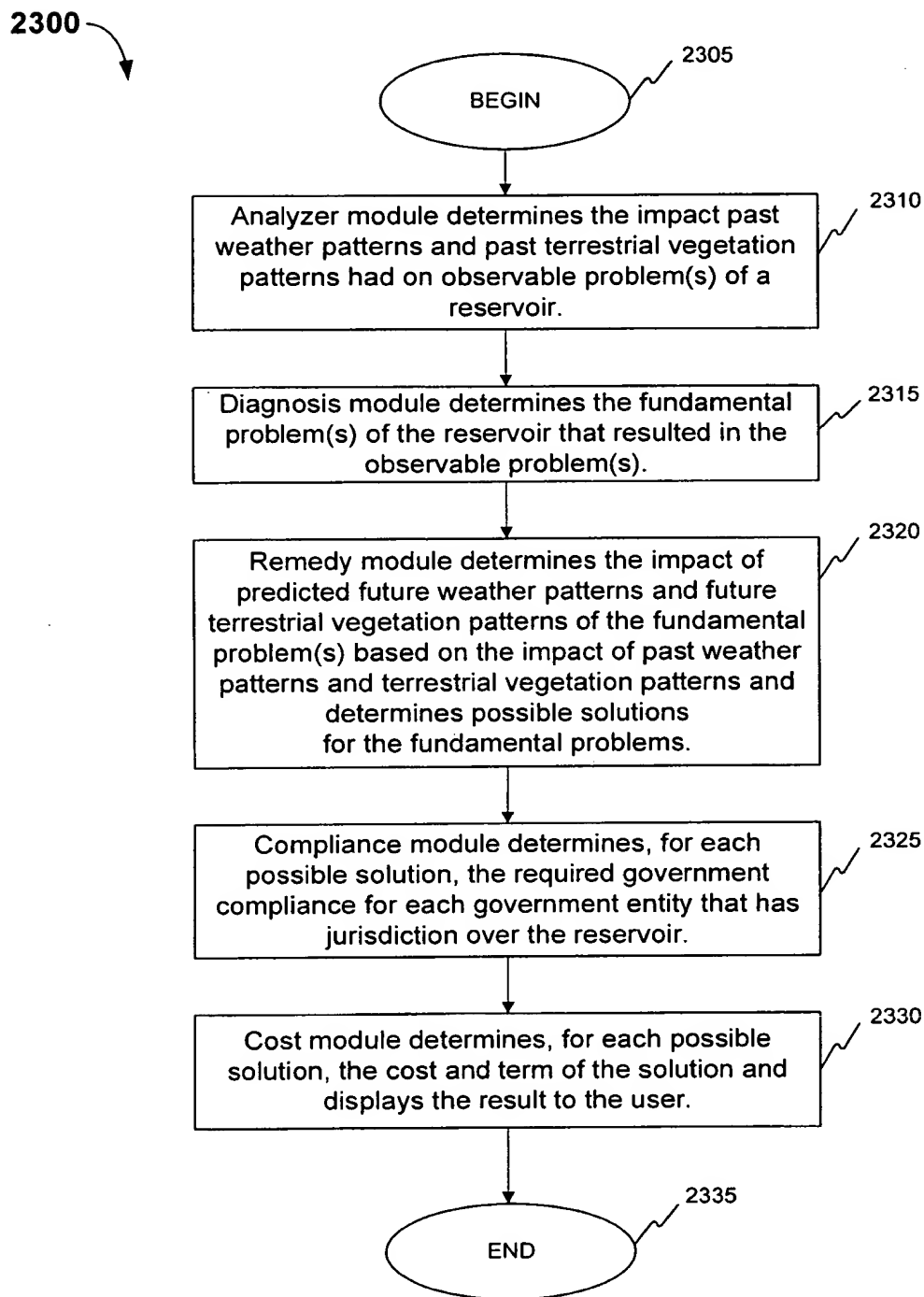
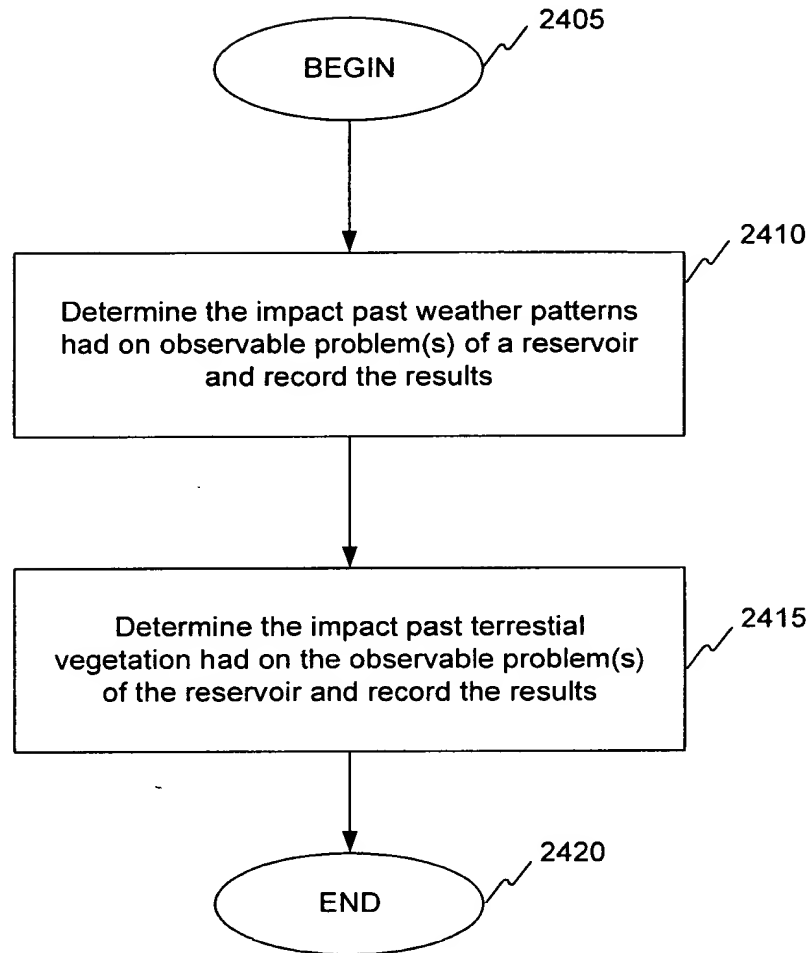


FIG. 22

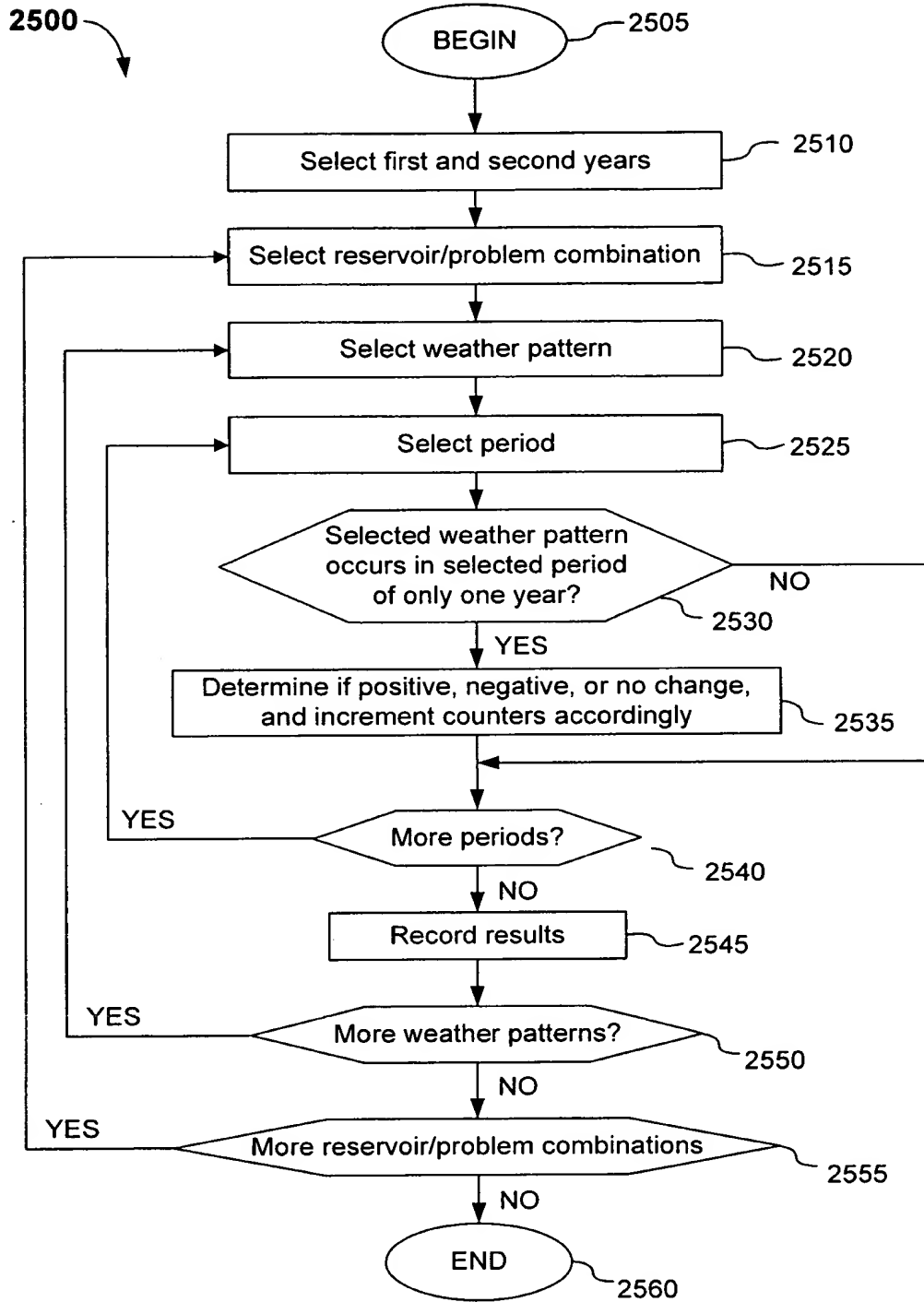


**FIG. 23**

2400



**FIG. 24**



**FIG. 25**

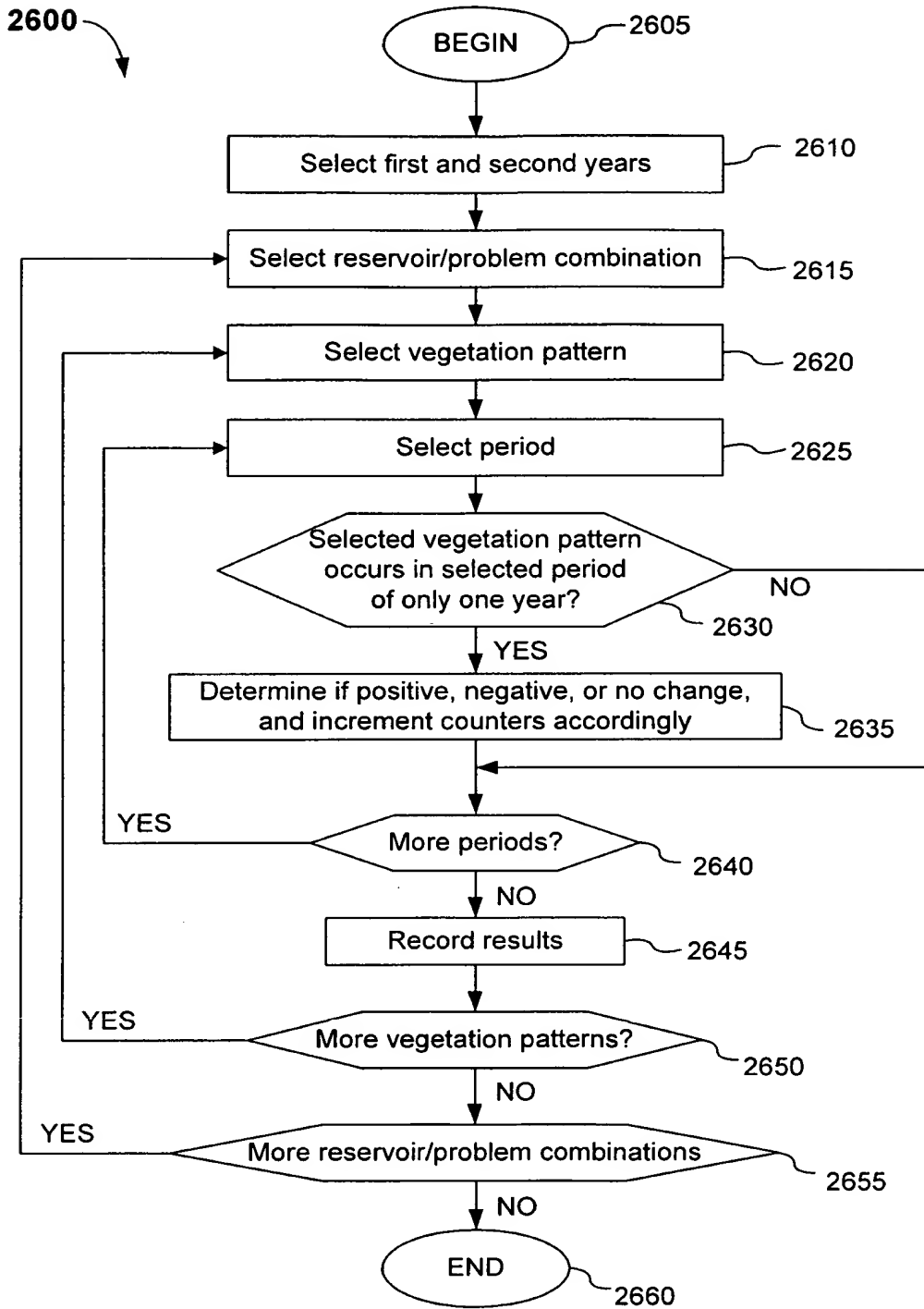
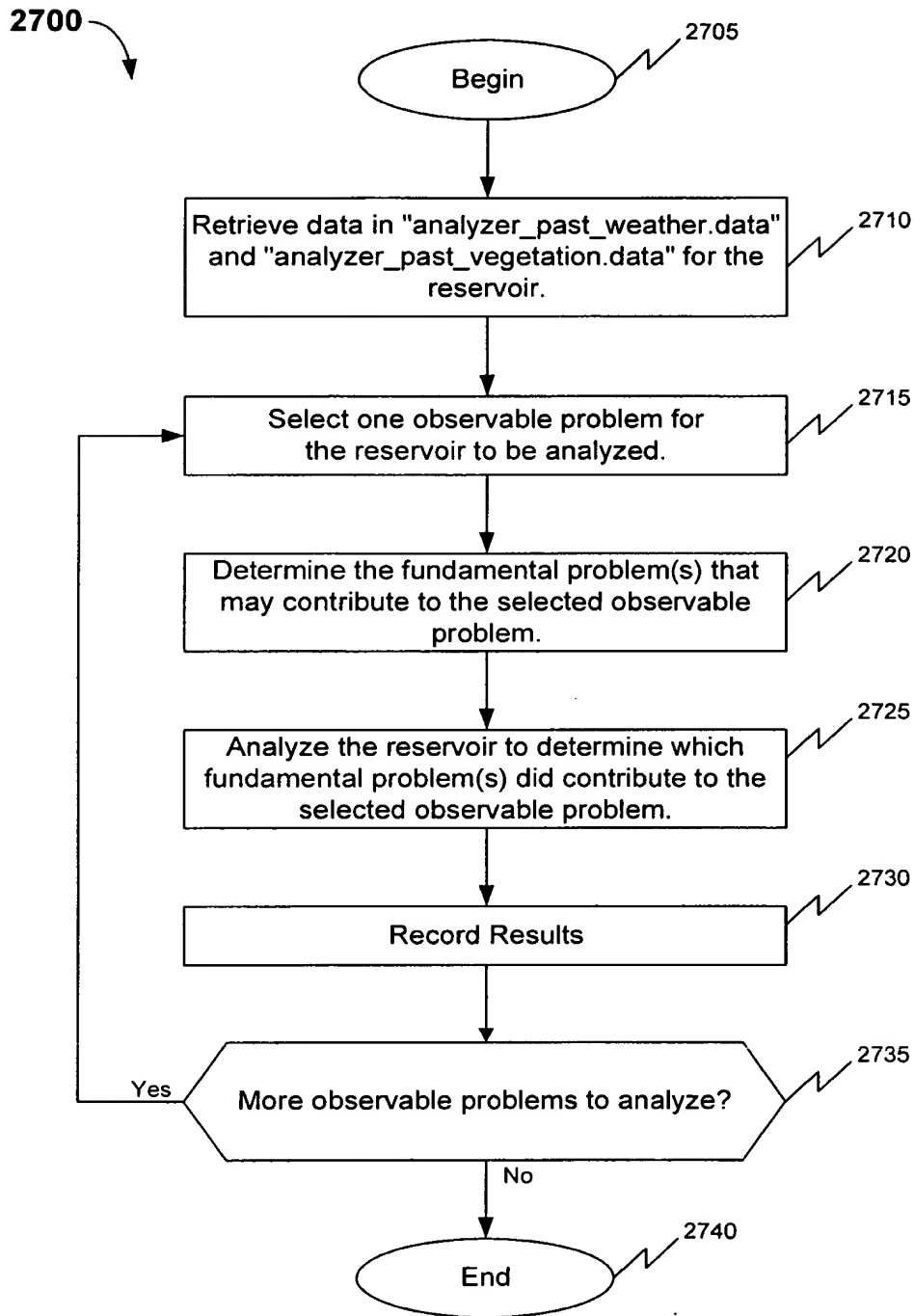


FIG. 26



**FIG. 27**

2800

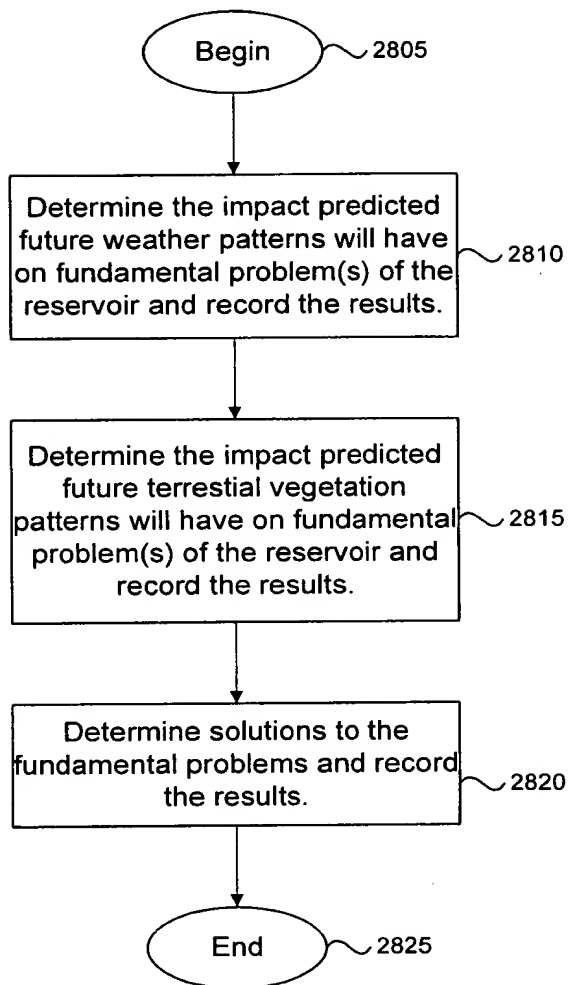


FIG. 28



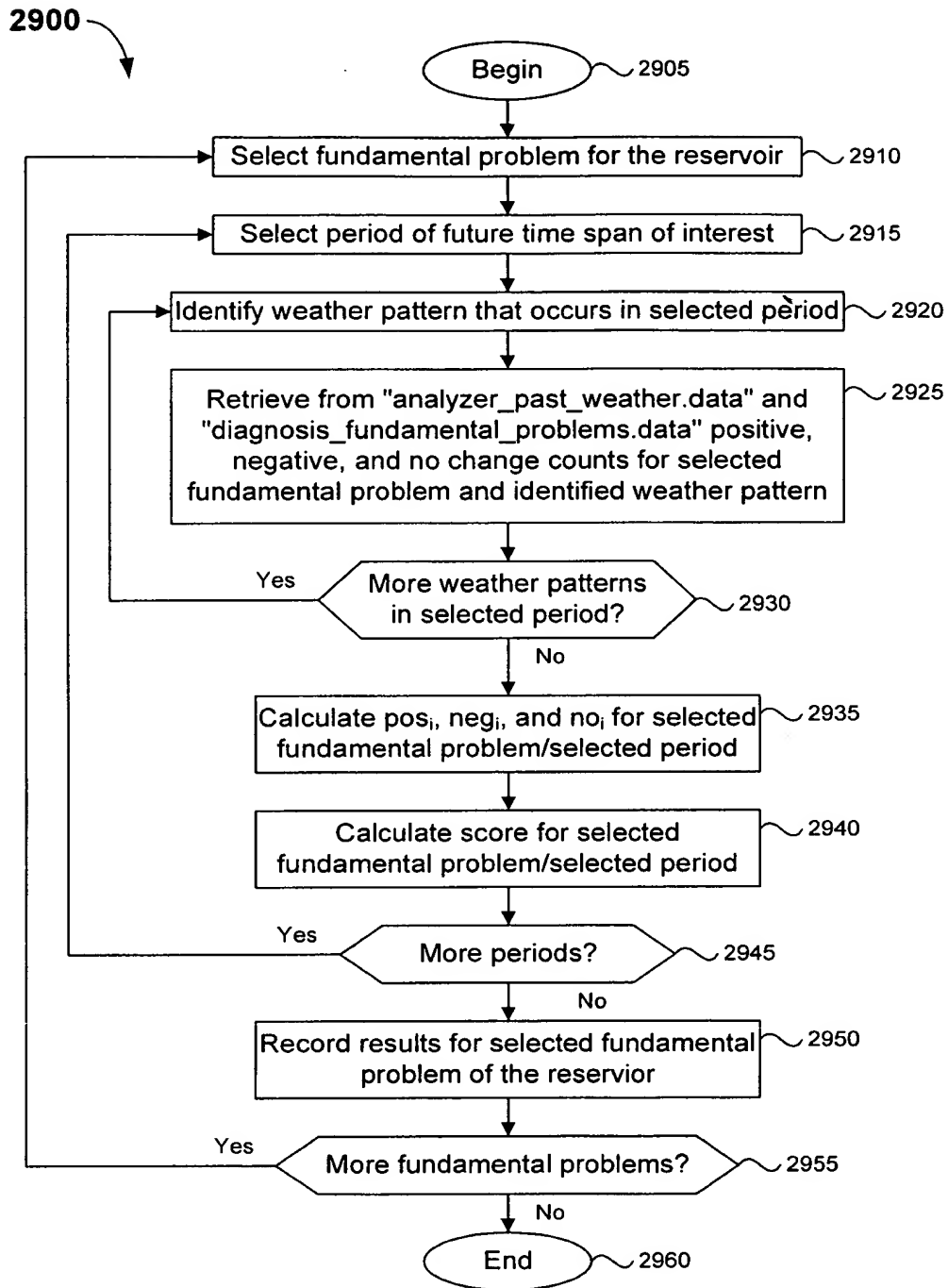


FIG. 29

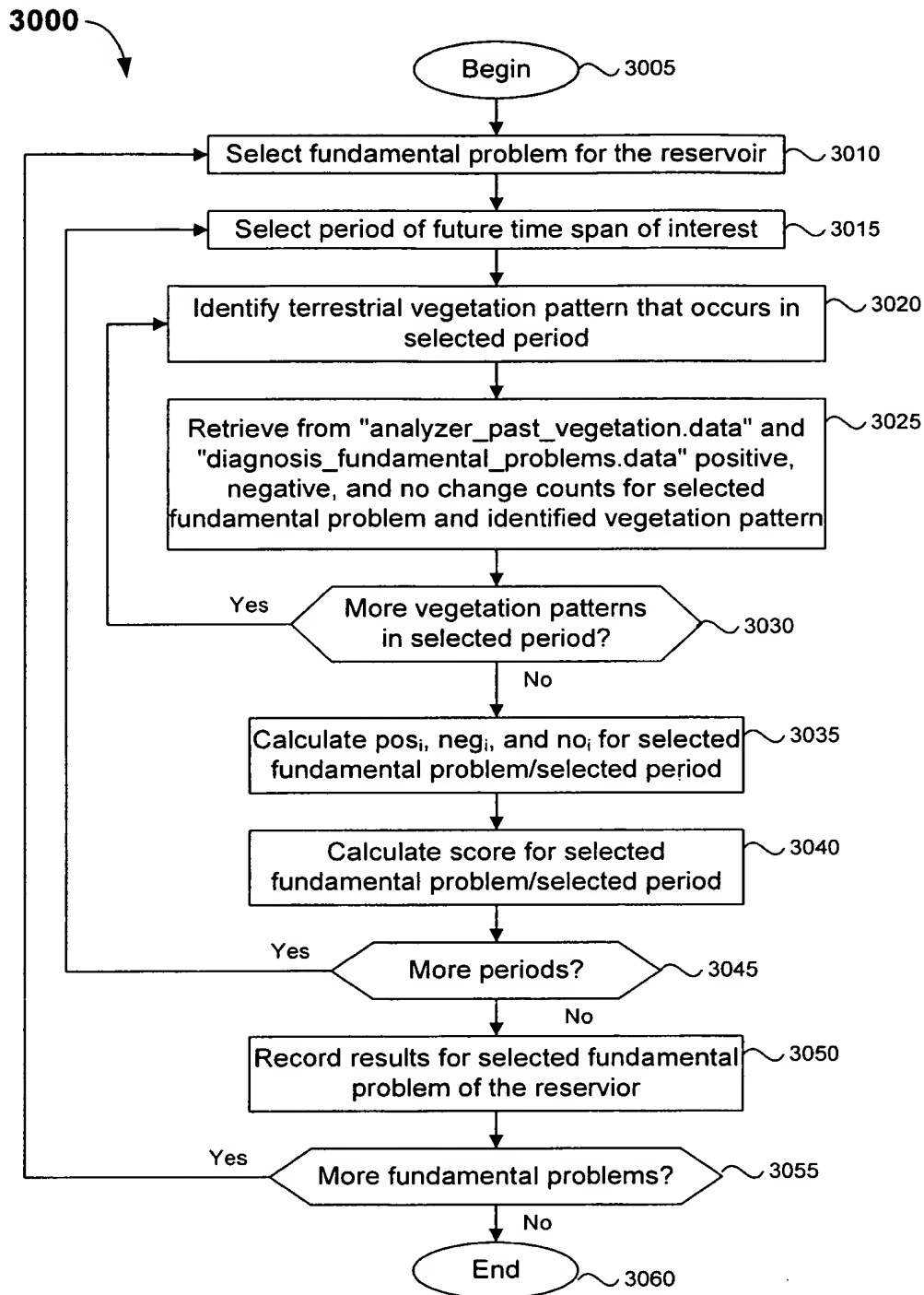


FIG. 30

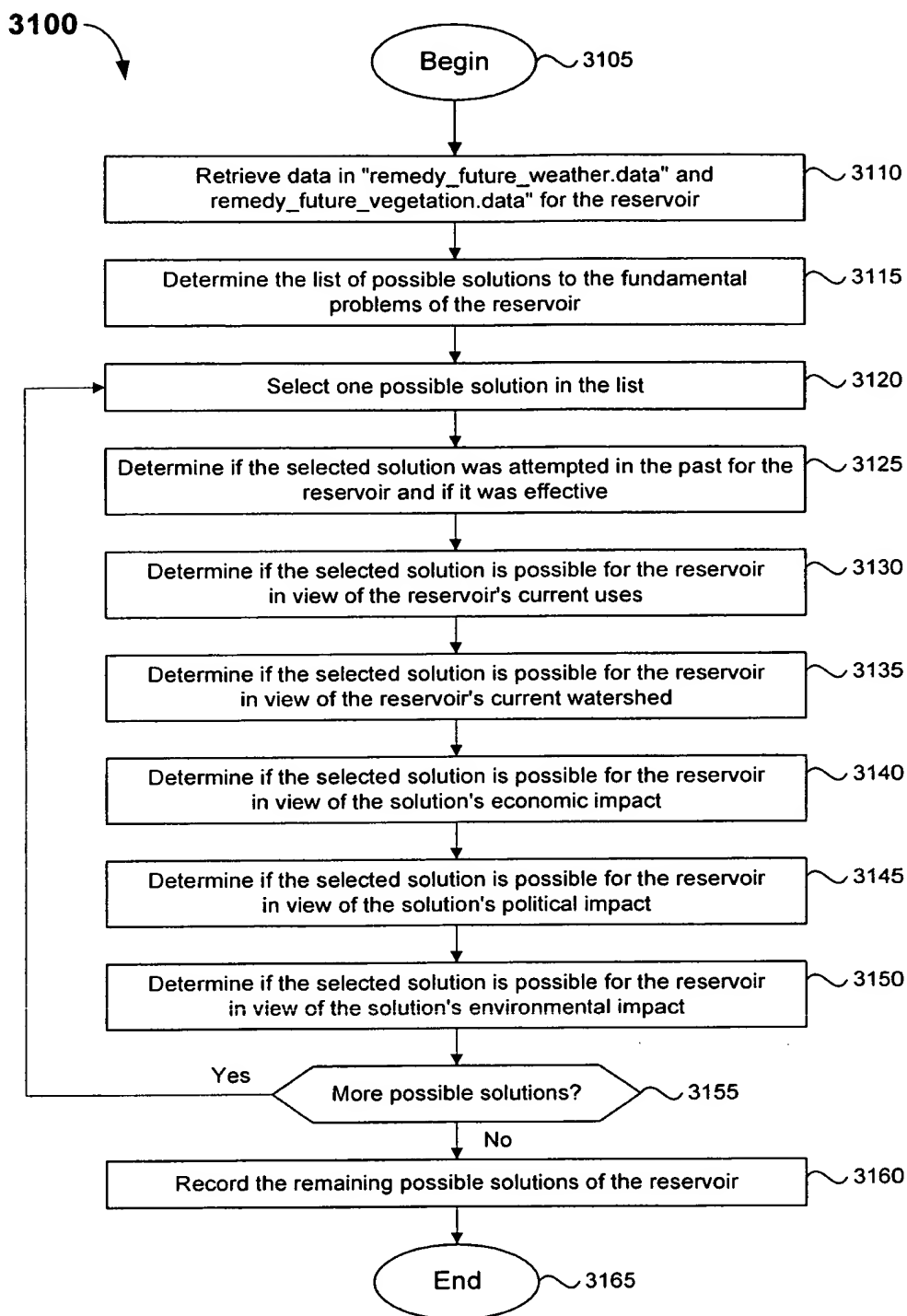
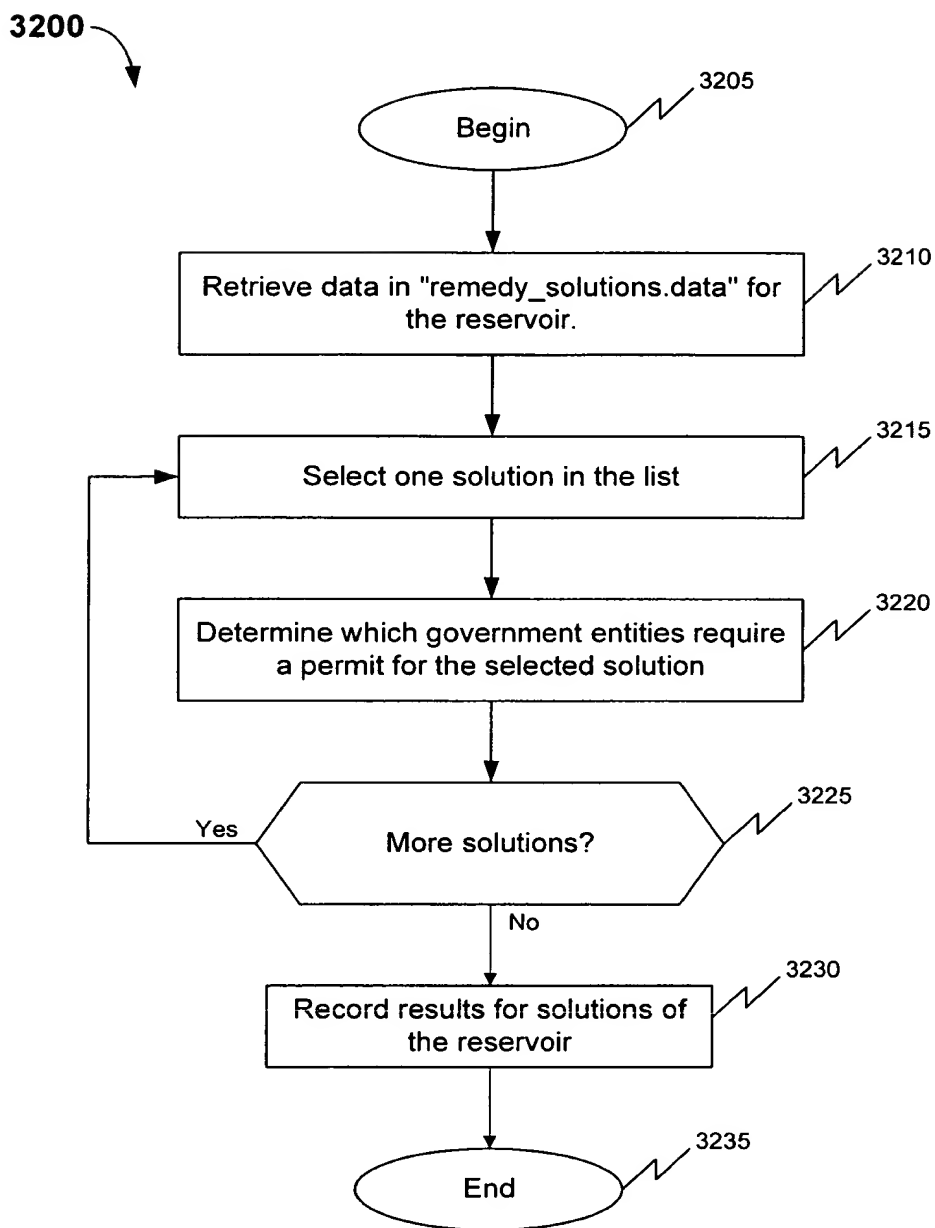
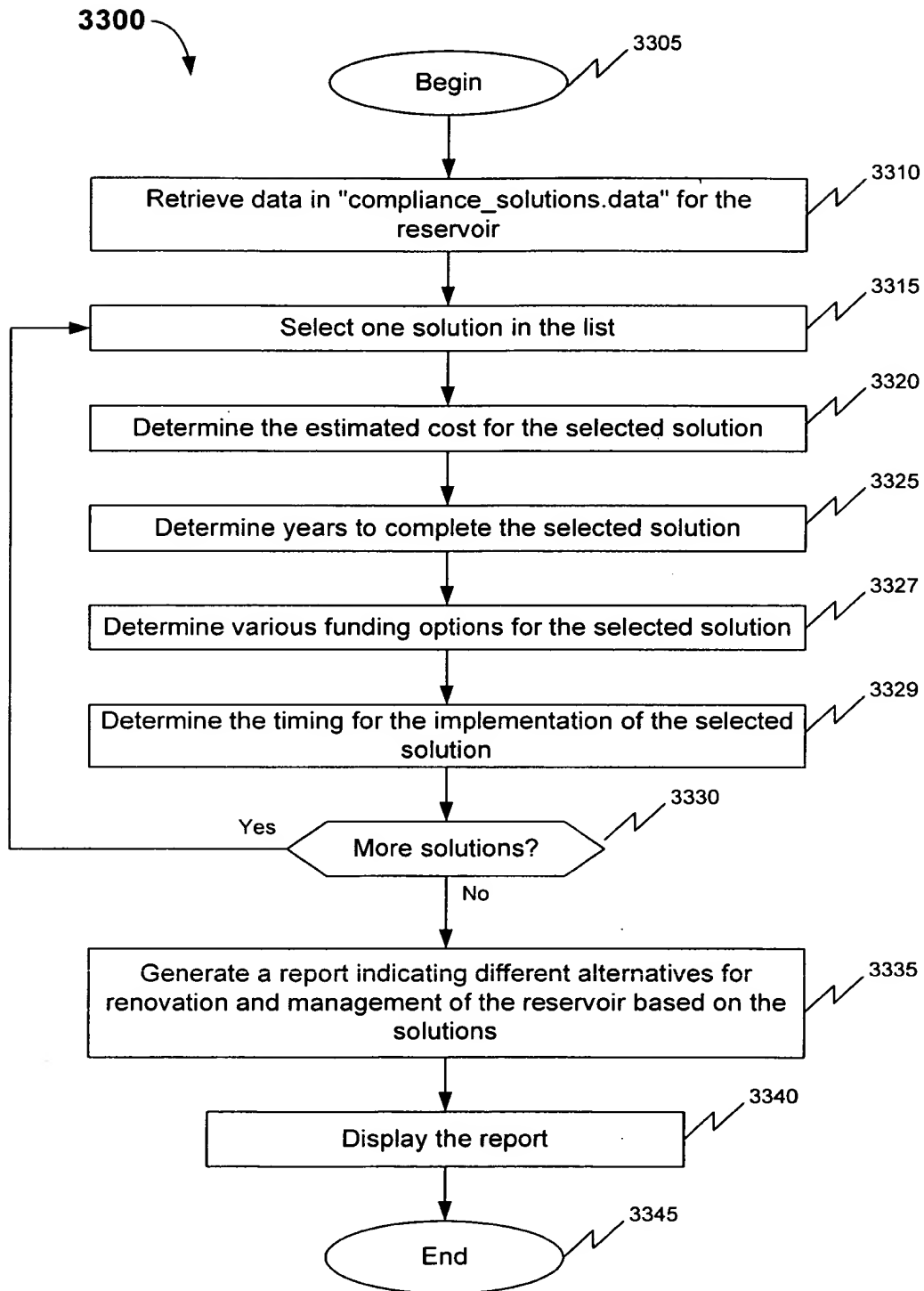


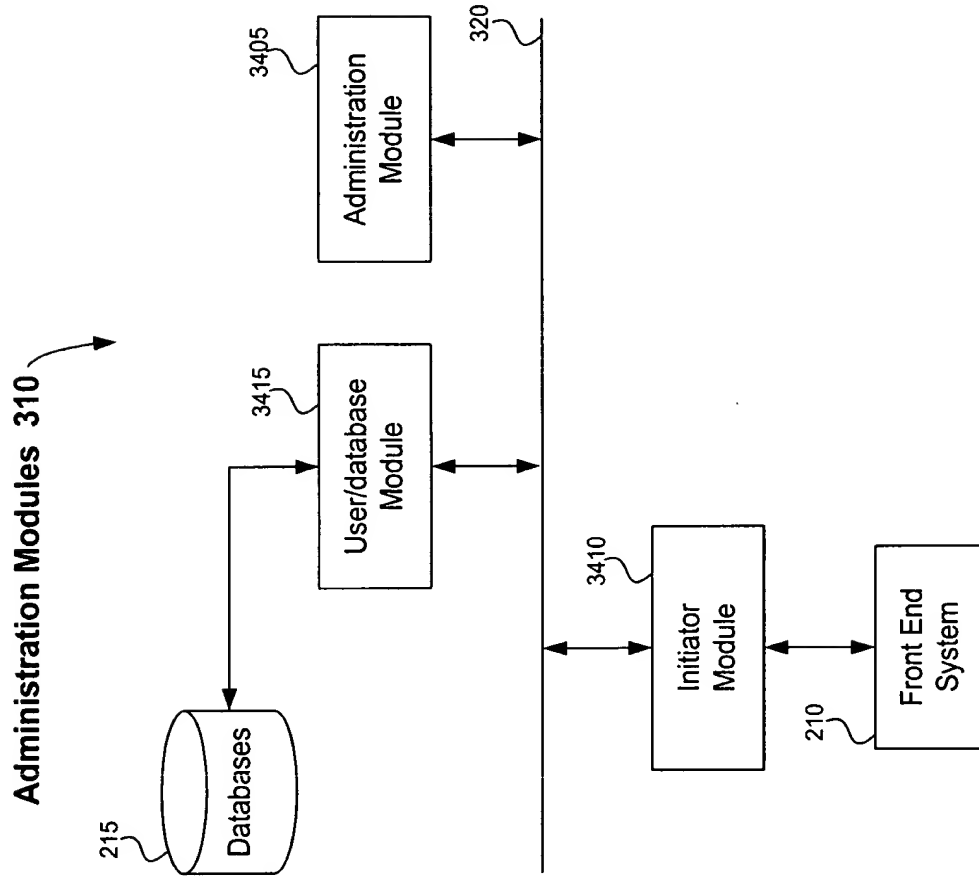
FIG. 31



**FIG. 32**



**FIG. 33**



**FIG. 34**

Computer System 3500

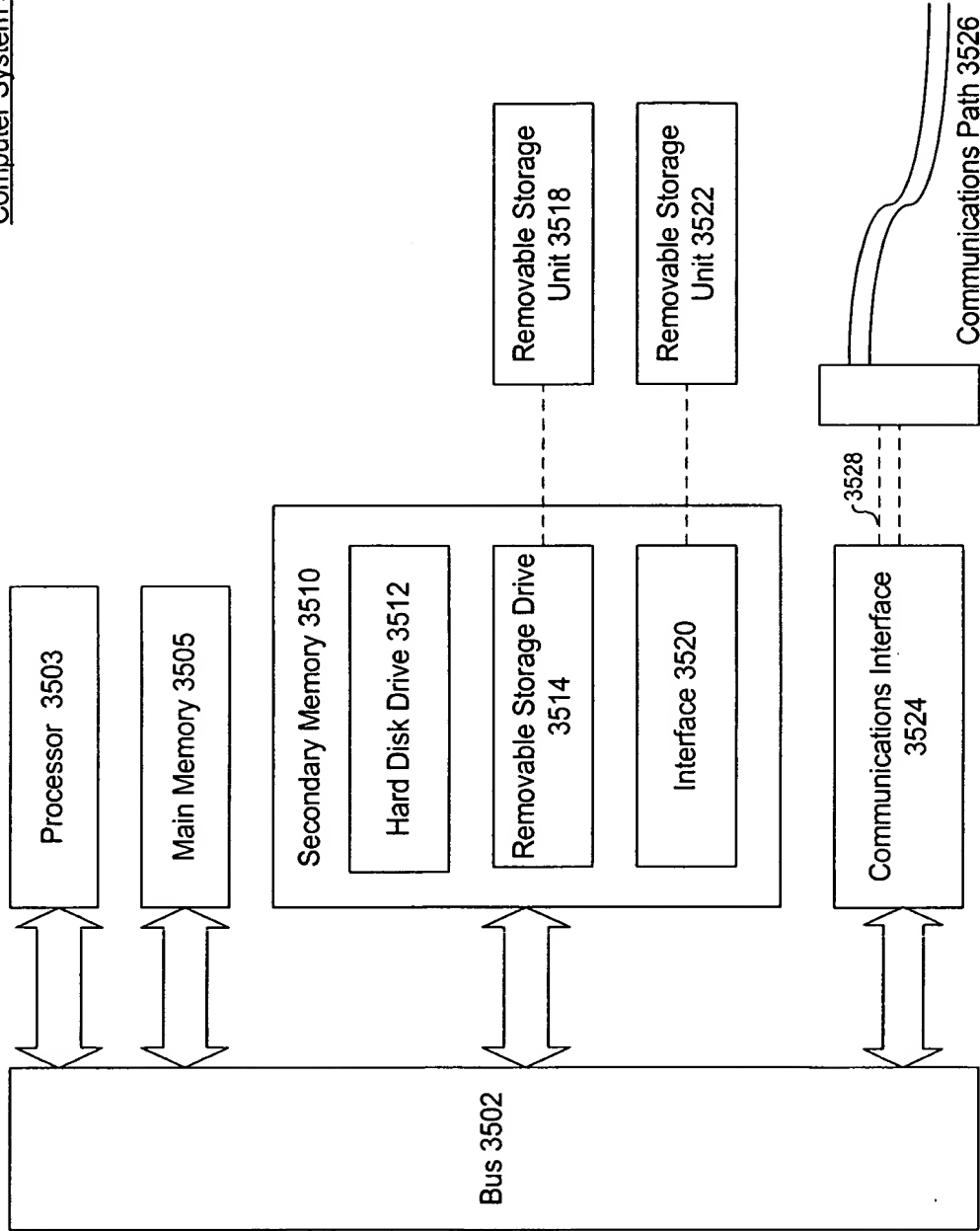


FIG. 35

# CLIENT

# SERVER

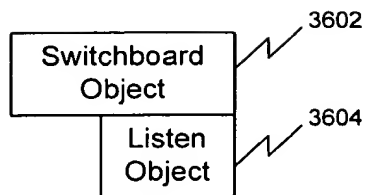


FIG. 36A

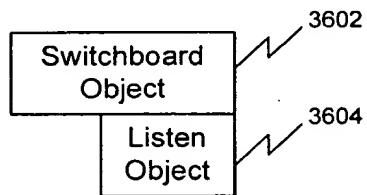


FIG. 36B

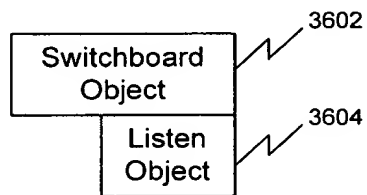


FIG. 36C

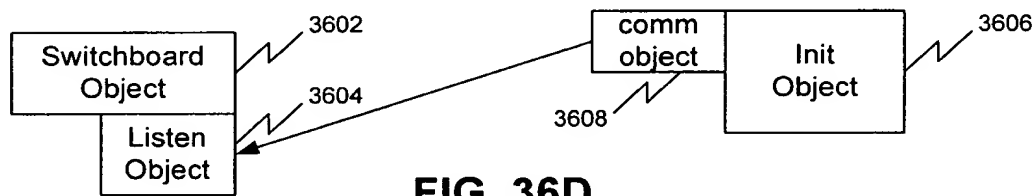


FIG. 36D

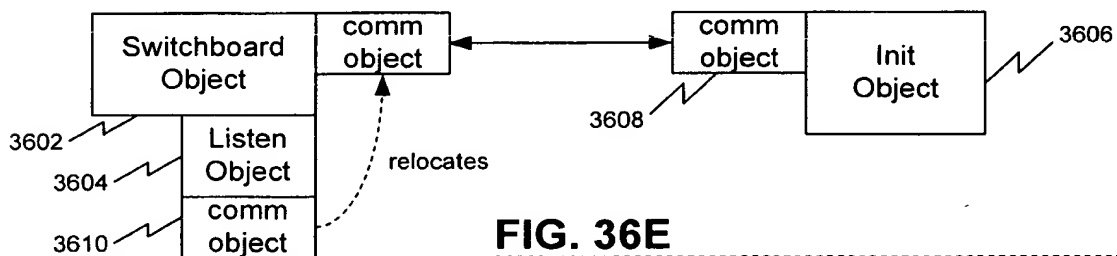


FIG. 36E

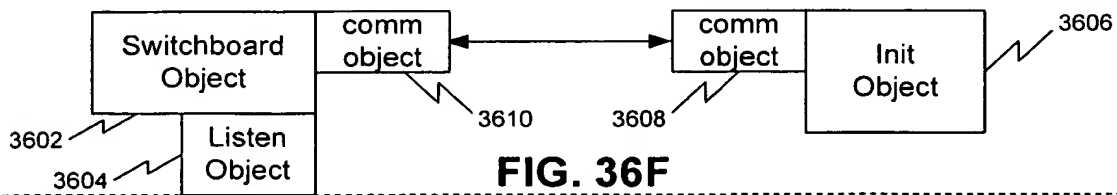


FIG. 36F



